Open Research Online

The Open University's repository of research publications
and other research outputs

Academic attainment in students with autism spectrum disorders in distance education

Journal Item

How to cite:

Richardson, John T. E. (2017). Academic attainment in students with autism spectrum disorders in distance education. Open Learning: The Journal of Open and Distance Learning, 32(1) pp. 81–91.

For guidance on citations see FAQs.

© 2016 The Open University

Version: Accepted Manuscript

Link(s) to article on publisher's website:
http://dx.doi.org/doi:10.1080/02680513.2016.1272446

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data policy on reuse of materials please consult the policies page.

oro.open.ac.uk

Academic attainment in students with autism spectrum disorders in distance education

John T. E. Richardson*

Institute of Educational Technology, The Open University, Milton Keynes, UK

*Email: John.T.E.Richardson@open.ac.uk

Acknowledgement

I am grateful to James Forman for generating the data set that was analysed in this study and to Emma Greenstein and Kate Lister for advice concerning support for students with ASDs at the Open University.

Disclosure statement

No potential conflict of interest was reported by the author.

Notes on contributor

John T. E. Richardson is Professor in Student Learning and Assessment in the Institute of Educational Technology at the Open University. His main research interests are concerned with the relationship between students' perceptions of their courses of study in higher education and the approaches to studying that they adopt on those courses.

Abstract

This investigation studied attainment in students with autism spectrum disorders (ASDs) who were taking modules by distance learning with the UK Open University in 2012. Students with ASDs who had no additional disabilities were as likely as nondisabled students to complete the modules that they had taken, to pass the modules that they had completed and to obtain good grades for the modules that they had passed. Students with ASDs who had additional disabilities were less likely than nondisabled students to complete the modules that they had taken, but they were as likely as nondisabled students to pass the modules that they had completed and to obtain good grades for the modules that they had passed. Their lower completion rate presumably reflects the impact of their additional disabilities rather than their ASDs. In distance education, at least, students with ASDs tend to perform on a par with their nondisabled peers.

Keywords: academic attainment; autism spectrum disorders; disabled students; distance education

Introduction

Changes in diagnostic procedures and a heightened public awareness over the last 25 years have led to a marked increase in the numbers of children diagnosed with autism spectrum disorders (ASDs) (Fombonne, 2009; Newschaffer et al., 2007; Smeeth et al., 2004). Many of these children are now eligible to enter higher education, and the last 10 years have seen a corresponding increase in the numbers of students with ASDs. In the UK, the Higher Education Statistics Agency did not collect separate statistics about such students before the academic year 2003–2004. In that year, however, it recorded that 80 UK-domiciled students with ASDs had been admitted to their first year of study at UK institutions. In contrast, in 2012–2013, it recorded that 1,995 UK-domiciled students with ASDs had been admitted to their first year of study.[1]

Over the same period there has been an increased interest on the part of researchers in the experiences of these students, the accommodations that they might need, and the attitudes of their teachers (e.g. Chown & Beaven, 2012; Gobbo & Shmulsky, 2014; McKeon, Alpern, & Zager, 2013; M. Taylor, 2005; Thierfeld Brown, Wolf, & Wenzel, 2014; VanBergeijk, Klin, & Volkmar, 2008; White, Ollendick, & Bray, 2011). A key issue appears to be the heightened level of social anxiety and other psychiatric difficulties that are experienced by students with ASDs (Freeth, Bullock, & Milne, 2013; Kanne, Christ, & Reiersen, 2009; Van Hees, Moyson, & Roeyers, 2015). Nevertheless, very little is known about the attainment of these students in higher education.

At a local level, the number of students with ASDs within a single institution may be too small to make reliable comparisons with the attainment of students without disabilities. As a result, researchers have tended to rely on small-scale qualitative investigations of the experiences of students with ASDs. For example, M. Taylor (2005) reported the results of a

case study that involved just three such students. Studies of this sort provide valuable information that can be used to promote the development of support services, but they do not provide evidence on the more fundamental question of the attainment of students with ASDs.

One higher education institution that recruits large numbers of people with disabilities is the UK Open University, which offers degree programmes by distance education. Indeed, for some people with disabilities, distance learning may be the only practical means of access to higher education (Newell & Debenham, 2009). Online distance learning might also be a more congenial mode of study for people with social anxiety or other psychiatric difficulties. Accordingly, the present study was carried out to compare academic attainment in students with ASDs and in nondisabled students who were taking Open University modules. The first part of the analysis describes the demographic characteristics of students with ASDs and nondisabled students. The second part compares completion rates, pass rates and grades in students with ASDs and nondisabled students. The third part compares completion rates, pass rates and grades when differences in demographic variables are taken into account.

Context

The Open University was set up in 1969 to provide degree programmes by distance education across the UK. It accepts all applicants over the normal minimum age of 16 onto most of its undergraduate modules without imposing any formal entrance requirements. Initially, nearly all of its modules were delivered by correspondence materials, combined with television and radio broadcasts, video and audio recordings, tutorial support offered at a local level, and (in some cases) week-long residential schools. In more recent years, the University has made increasing use of computer-based support, particularly CD-ROMs, dedicated websites and computer-mediated conferencing. Moreover, nowadays many students are recruited from

other European countries, and on some modules they are recruited from around the world.

The Open University's arrangements for undergraduates traditionally had a modular structure in which prerequisite requirements were minimised and students were not restricted to prescribed schemes of study. Students enrolled for individual modules rather than for entire degree programmes, and they qualified for a bachelor's degree when they had gained the appropriate number of credit points (equivalent to three years' full-time study) from modules that they had passed. Most of the University's modules are worth 30 or 60 credit points, on the basis that full-time study consists of modules worth 120 credit points in any calendar year. Students may register for two or more modules at a time up to a maximum load of 120 credit points.[2]

Students with ASDs

In 2012, a total of 175,924 students registered for undergraduate modules with the Open University, of whom 115,086 (or 65.4%) had registered for a single module, 38,780 (or 22.0%) had registered for two modules and 22,058 (or 12.5%) had registered for three or more modules. At the time of their registration, the students had been asked to declare whether they had a disability or additional requirements. Those students who did so declare were followed up by telephone to establish the nature of their disabilities and the accommodations or other support that they might require. It is important to note that the prevalence of particular disabilities is based on self-report rather than clinical assessment.

Of the 175,924 students, 21,083 (or 12.0%) had declared that they had one or more disabilities. Information about the nature of these students' disabilities was recorded using the checklist shown in Table 1. The list includes symptoms and medical conditions as well as disabilities in a narrow sense, and this may have contributed to the fact that 9,007 (or 42.7%)

of the students had been recorded as having more than one disability. Table 1 shows the prevalence of each disability among all 175,924 students.

(Insert Table 1 about here)

Of the 175,924 students who registered in 2012, 552 (or 0.31%) had declared that they had ASDs. Within this subgroup, 209 were recorded as having only this disability, whereas 343 were recorded as having one or more additional disabilities. In short, 62% of students with ASDs had one or more additional disabilities. Among the latter students, the most common additional disabilities were mental health difficulties (208 students), dyslexia or other specific learning difficulty (138 students), fatigue or pain (92 students) and unseen disabilities (67 students).[3] This is consistent with the general pattern of co-morbidity reported in the research literature (Kanne et al., 2009; VanBergeijk et al., 2008).

The Open University adopts a systematic and holistic approach to the support of students with ASDs. Information about ASDs is widely available across the University for the benefit of students, teachers and support staff. Students with ASDs may be encouraged to appoint an advocate to facilitate their communications with the University especially with regard to their specific requirements. Teachers are expected to be flexible and supportive with regard to the administration, timing and wording of assessments and to provide suitable preparation and accommodation, especially for examinations. Students may be provided with a mentor or a non-medical helper to provide study-related (but not subject-specific) support or with technical or human support (e.g. an amanuensis) for assessments. They can also be provided with assistive technology to address reading or writing challenges. Tutors are expected to familiarise themselves with students' need for reasonable adjustments, and they may be asked to provide additional individual support sessions.

Students taking Open University modules are different from other students in UK

higher education, especially in terms of their age and their educational background. Moreover, it might have been their additional disabilities rather than their ASDs which had led some students with ASDs to study with the Open University. The following analyses therefore compare three groups of students: the students with no disability; the students with ASDs only; and the students with ASDs plus additional disabilities ('ASDs plus').

Age

Table 2 shows the age distributions of these three groups. (Relevant data were missing for four students.) A chi-squared test showed that these were significantly different from each other, $\chi^2(12, N = 155{,}389) = 330.42$, $p < .001$. An analysis of variance using a Newman-Keuls post hoc test showed that the students with ASDs only ($M = 26.50$ years) were significantly younger than the students with ASDs plus ($M = 30.01$ years), who were in turn significantly younger than the students with no disabilities ($M = 35.71$). This pattern reflects the increased identification of ASDs among children and young people in recent years.

(Insert Table 2 about here)

Gender

ASDs are more common in boys than in girls by a factor of between 4:1 and 5:1, although the disparity is less in children who are cognitively impaired (see Fombonne, 2005; Smeeth et al., 2004**)**. Table 3 shows the percentages of women in the three groups of students. (Relevant data was missing for one student.) A chi-square test showed that these were significantly different from each other, $\chi^2(2, N = 155{,}392) = 134.02$, $p < .001$. Further tests showed that the proportion of women was significantly lower in the students with ASDs plus than in the

nondisabled students and significantly lower in the students with ASDs only than in the students with ASDs plus, consistent with differences in the overall prevalence of ASDs.

(Insert Table 3 about here)

Entrance qualifications

The Open University accepts applicants over the minimum age of 16 onto most of its modules without imposing formal entrance requirements. The students' highest educational qualifications before joining the Open University were classified into three categories by comparison with the General Certificate of Education, Advanced Level (GCE A-Level), which is the main university entrance qualification in the UK: low, less than two passes at GCE A-Level or the equivalent; medium, two or more passes at GCE A-Level, the normal minimum entry requirement at other UK universities, or the equivalent; and high, qualifications beyond GCE A-Level. Table 3 shows the distributions of prior qualifications for the three groups of students. (Relevant data were missing for 260 students.) A chi-square test showed that these were significantly different from each other, $\chi^2(4, N = 155{,}133) = 31.91$, $p < .001$. Further tests showed that the nondisabled students tended to have higher qualifications than the students with ASDs only or the students with ASDs plus, but that the two latter groups were not significantly different from each other. This may reflect reduced opportunities and support for students with ASDs in secondary and further education.

Socioeconomic circumstances

On the basis of their personal circumstances, Open University students could apply for financial assistance towards the cost of their registration fees and study materials. The award of such assistance may be taken as a rough proxy for lower socioeconomic circumstances.

Table 3 shows the percentages of students receiving such assistance in the three groups. A chi-square test showed that these were significantly different from each other, $\chi^2(2, N = 155{,}393) = 122.63$, $p < .001$. Further tests showed that the proportion of students receiving financial assistance was significantly lower in the nondisabled students than in the students with ASDs only and the students with ASDs plus, but that the two latter groups were not significantly different from each other. In fact, Open University students with disabilities of all kinds are more likely to be receiving financial assistance than are nondisabled students (Richardson, 2010).

Subject of study

The students were classified according to their subject of study into the 10 categories in Table 4. Students registered for two or more modules were classified according to the first module for which they had registered. (Openings modules are intended for students who are new to higher education or who are switching to a new area of study. They are all assessed simply on a pass/fail basis.) Table 4 shows the percentages of students across the 10 subjects in each of the three groups. A chi-square test showed that these were significantly different from each other, $\chi^2(18, N = 155{,}393) = 79.12$, $p < .001$. Further tests showed that the nondisabled students were significantly different from both the students with ASDs only and the students with ASDs plus but that the two latter groups were not significantly different from each other. Table 4 shows that students with ASDs were more likely than the nondisabled students to be studying mathematics and computing or technology but that they were less likely than the nondisabled students to be studying health and social care, education or business and law.

(Insert Table 4 about here)

Completion rates, pass rates and grades

Out of the 258,820 module registrations at the Open University in 2012, 176,788 (or 68.3%) led to successful completion. Table 5 shows the completion rates for the students in the three groups. A chi-square test showed that these were significantly different from each other, $\chi^2(2, N = 227{,}744) = 15.37$, $p < .001$. Further tests showed that the completion rate was significantly higher in the nondisabled students than in the students with ASDs plus, but that the students with ASDs only were not significantly different from either of these groups.

(Insert Table 5 about here)

Of the 176,788 completions, 163,366 (or 92.4%) led to passes. Table 5 shows the pass rates for the students in the various disability categories. A chi-square test showed that these were significantly different from each other, $\chi^2(2, N = 157{,}206) = 6.71$, $p = .04$. However, none of the pairwise comparisons among these three groups yielded a significant result.

Although some modules were assessed simply on a pass/fail basis, on many modules the passing students were awarded grades between 1 (distinction) and 4 (bare pass). Grades 1 and 2 can be regarded as 'good' grades that would merit the award of a good degree.[4] Out of the 85,944 registrations that led to a grade, 44,382 (or 51.6%) led to a good grade. Table 5 shows the distributions of grades and the percentages of good grades for the three groups of students. A chi-square test showed that these percentages were not significantly different from each other, $\chi^2(2, N = 76{,}844) = 2.64$, $p = .27$. In fact, students with ASDs only were, if anything, more likely than nondisabled students to obtain good grades.

One possibility is that attainment varied across the three groups because they tended to choose modules in different subjects. This notion can be tested by examining the interaction between the variation across the three groups and the effect of subject of study. This interaction was not significant in the case of the completion rates, $\chi^2(18, N = 227{,}744) =$

13.12, $p = .79$, the pass rates, $\chi^2(18, N = 157{,}206) = 28.36$, $p = .06$, or good grades, $\chi^2(16, N = 76{,}844) = 19.92$, $p = .22$. In other words, the pattern of attainment in nondisabled students, students with ASDs only and students with ASDs plus was similar across the different subjects, and so any differences in attainment are not due to different choices of subject.

Controlling for the effects of demographic characteristics

The analyses that have been described thus far have shown that the three groups of students vary with regard to the likelihood of their completing their modules. In other words, simply at a descriptive level, ASDs play a statistically significant role in predicting attainment. However, the three groups of students also vary with regard to age, gender, prior qualifications and socioeconomic circumstances. It follows that any apparent variation in the completion and attainment of students with ASDs is confounded with variations in their completion and attainment related to these demographic characteristics. Hierarchical logistic regression analyses were carried out to control for possible effects of age, gender, prior qualifications and financial assistance on completion and attainment in these students.

The results are reported in terms of odds ratios, which can be explained briefly as follows. If the probability of the members of Group 1 exhibiting a particular outcome is p (e.g. .60), then the odds of this are $p/(1 - p)$ (i.e. .60/.40 or 1.50). If the probability of the members of Group 2 exhibiting that outcome is q (e.g. .70), then the odds of this are $q/(1 - q)$ (i.e. .70/.30 = 2.33). The odds ratio is the ratio between these odds (i.e. $[p/(1 - p)]/[q/(1 - q)]$, which equals $[p(1 - q)]/[q(1 - p)]$). In this case, the ratio between the odds is 1.50/2.33 = 0.64. In other words, the odds of the members of Group 1 exhibiting the relevant outcome are 64% of the odds of the members of Group 2 exhibiting that outcome. Odds ratios vary from 0 (when $p = 0$ or $q = 1$) to infinity (when $p = 1$ or $q = 0$). An odds ratio of 1 means that there is

no difference in the odds of the two groups' members exhibiting the outcome (when $p = q$); an odds ratio less than 1 means that the members of Group 1 are less likely to exhibit the outcome than are the members of Group 2; and an odds ratio greater than 1 means that the members of Group 1 are more likely to exhibit the outcome than are the members of Group 2. Whether an odds ratio is significantly different from 1 depends on the odds ratio itself and on the number of members in each group.

Table 6 shows the odds ratios comparing the students with ASDs with the nondisabled students in terms of the completion rate, the pass rate and the proportion of good grades. The numbers in the three left-hand columns are unadjusted and correspond to the data in Table 5. For instance, the odds of the students with ASDs only completing their modules were 9% (i.e. $[1 - 0.91] \times 100$) less than the odds of nondisabled students completing their modules. The numbers in the three right-hand columns are adjusted for the possible effects of age, gender, prior qualifications and financial assistance (all treated as categorical variables). For instance, the odds of the students with ASDs plus completing their modules were 20% (i.e. $[1 - 0.80] \times 100$) less than the odds of nondisabled students completing their modules when these other characteristics had been taken into account.

(Insert Table 6 about here)

In the case of the completion rates, the combined effects of age, gender, prior qualifications and financial assistance were highly significant, $\chi^2(10, N = 227{,}408) = 3154.72$, $p < .001$. Students aged less than 30 were less likely to complete their modules than were older students, $\chi^2(6, N = 227{,}408) = 416.72$, $p < .001$; women were more likely to complete their modules than were men, $\chi^2(1, N = 227{,}408) = 28.27$, $p < .001$; students with medium or high prior qualifications were more likely to complete their modules than were students with low qualifications, $\chi^2(2, N = 227{,}408) = 1754.57$, $p < .001$; and students who

had financial assistance were less likely to complete their modules than were students who did not, $\chi^2(1, N = 227{,}408) = 490.52$, $p < .001$. When these effects had been statistically controlled, the completion rates for the three groups of students were still significantly different from each other, $\chi^2(2, N = 227{,}408) = 6.18$, $p = .046$. Table 6 shows that the completion rate was significantly lower in the students with ASDs plus than in the students with no disabilities but not in the students with ASDs only.

In the case of the pass rates, the combined effects of age, gender, prior qualifications and financial assistance were highly significant, $\chi^2(10, N = 156{,}996) = 1414.69$, $p < .001$. Students aged less than 30 were less likely to pass their modules than were older students, $\chi^2(6, N = 156{,}996) = 397.38$, $p < .001$; women were more likely to pass their modules than were men, $\chi^2(1, N = 156{,}996) = 69.03$, $p < .001$; students with medium or high prior qualifications were more likely to pass their modules than were students with low qualifications, $\chi^2(2, N = 156{,}996) = 257.75$, $p < .001$; and students who had financial assistance were less likely to pass their modules than were students who did not, $\chi^2(1, N = 156{,}996) = 458.54$, $p < .001$. When these effects had been statistically controlled, the pass rates for the three groups of students were not significantly different from each other, $\chi^2(2, N = 156{,}996) = 0.48$, $p = .79$. Table 6 shows that the pass rate was not significantly different in the students with ASDs only or the students with ASDs plus than in the students with no disabilities. It may be noted in particular that the nonsignificant tendency for students with ASDs to be less likely than nondisabled students to pass their modules was largely due to the effects of confounded demographic variables.

With regard to obtaining good grades, the combined effects of age, gender, prior qualifications and financial assistance were highly significant, $\chi^2(10, N = 76{,}724) = 1883.38$, $p < .001$. Students aged less than 30 were less likely to obtain good grades than were older

students, $\chi^2(6, N = 76{,}724) = 295.74$, $p < .001$; men were more likely to obtain good grades than were women, $\chi^2(1, N = 76{,}724) = 7.17$, $p = .007$; students with medium or high prior qualifications were more likely to obtain good grades than were students with low qualifications, $\chi^2(2, N = 76{,}724) = 703.89$, $p < .001$; and students who had financial assistance were less likely to obtain good grades than were students who did not, $\chi^2(1, N = 76{,}724) = 318.41$, $p < .001$. When these effects had been statistically controlled, the proportions of good grades for the three groups of students were not significantly different from each other, $\chi^2(2, N = 76{,}724) = 3.07$, $p = .22$. Table 6 shows that the proportion of good grades was not significantly different in the students with ASDs only or the students with ASDs plus than in the students with no disabilities. Once again, students with ASDs only were, if anything, more likely than nondisabled students to obtain good grades.

Conclusions

As far as the student population of the UK Open University is concerned, students with ASDs who have no additional disabilities tend to be younger than nondisabled students, they are more likely to be men, they tend to have lower prior qualifications, and they are more likely to be receiving financial assistance. They are as likely as nondisabled students to complete the modules that they have taken, to pass the modules that they have completed and to obtain good grades for the modules that they have passed. All of these conclusions remain the case when the effects of age, gender, prior qualifications and financial assistance on attainment have been taken into account.

The Open University has an open admissions policy whereby applicants are accepted onto most of its modules (and nowadays most of its qualifications) without imposing formal entrance requirements. Nevertheless, the students with whom this investigation is concerned

are self-selected, insofar as they have chosen to study with the Open University and can thus be presumed to have made the decision that they can cope with the demands of its modules. The present results are therefore consistent with suggestions in the literature that up to 60% of people with ASDs are intellectually unimpaired and by implication can tackle the academic challenges of postsecondary education (see VanBergeijk et al., 2008). The practical implication is, as Chown and Beavan (2012) concluded, that given a supportive learning and teaching environment, students with ASDs can perform on a par with their nondisabled peers.

Students with ASDs who have additional disabilities tend to be younger than nondisabled students, they are more likely to be men, they tend to have lower prior qualifications, and they are more likely to be receiving financial assistance. They are less likely than nondisabled students to complete the modules that they have taken, but they are as likely as nondisabled students to pass the modules that they have completed and to obtain good grades for the modules that they have passed. The disparity in the completion rate between these students and those with ASDs alone (see Table 6) presumably reflects the impact of their additional disabilities (especially mental health difficulties, dyslexia or other specific learning difficulties, fatigue or pain, and unseen disabilities) rather than their ASDs. These conclusions, too, remain the case when the effects of age, gender, prior qualifications and financial assistance on attainment have been taken into account. The implication is that teachers and support staff need to focus on accommodating these additional disabilities.

The estimated prevalence of ASDs in the general population continues to increase over time, although it is not clear whether this is due to a true increase in prevalence or to changes in diagnostic procedures, increased public awareness and access to relevant services (Centers for Disease Control and Prevention, 2012; Newschaffer et al., 2007; Smeeth et al., 2004).[5] Fombonne (2009) estimated that internationally the actual prevalence of pervasive

developmental disorders (of which ASDs are the large majority) was between 0.6% and 0.7%. Whatever the cause, institutions of higher education are likely to admit increasing numbers of students with ASDs in the years to come, and the present results should help motivate them to provide appropriate support for these students in their academic studies.

Notes

1. For these and other data, see https://www.hesa.ac.uk/content/view/1973/239/. The figure of 1,995 students implies a prevalence of ASDs across the UK higher education sector of 0.27%. Nevertheless, this excludes students with ASDs who have additional disabilities. They are recorded by the Higher Education Statistics Agency as having multiple disabilities and cannot be separately identified as having ASDs. It should also be noted that the Agency rounds reported frequency values to the nearest multiple of five to prevent the disclosure of personal information about any individual.

2. In 2012, the UK government required English universities to increase their fees to reflect the true cost of delivering their programmes and extended the availability of student loans. To qualify for loans, students have to register for specific qualifications, and since 2012 a majority of Open University students in England and Northern Ireland have registered for entire degree programmes rather than for individual modules.

3. In North America, ‘unseen disabilities’ are more commonly referred to as ‘invisible disabilities’ or ‘hidden disabilities’. However, ‘unseen disabilities’ is widely regarded as an unsatisfactory term because it covers a large and heterogeneous group of disabilities. Even so, it is routinely used in UK national statistics on education, and diabetes, epilepsy

and asthma are the most commonly cited examples. The Open University's records do not permit the disaggregation of different groups of students within this category.

4. Most first degrees in the UK are awarded with honours, which are usually classified as first, second or third class, and the second class is normally categorised into an upper and a lower division. A degree that is awarded with either first-class or upper second-class honours is often described as a 'good' degree. When determining the class of honours degrees at the Open University, the boundary between Grades 2 and 3 maps onto that between upper and lower second-class honours.

5. There is a suggestion that, in the UK at least, the prevalence of ASDs may have reached a plateau in the last 10 years (B. Taylor, Jick, & MacLaughlin, 2013).

References

Centers for Disease Control and Prevention. (2012). Prevalence of autism spectrum disorders: Autism and developmental disabilities monitoring network, 14 sites, United States, 2008. *Morbidity and Mortality Weekly Report*, 61(SS03), 1–19. Retrieved from https://www.cdc.gov/mmwr/preview/mmwrhtml/ss6103a1.htm

Chown, N., & Beaven, N. (2012). Intellectually capable but socially excluded? A review of the literature and research on students with autism in further education. *Journal of Further and Higher Education, 36*, 477–493. doi:10.1080/0309877X.2011.643771

Fombonne, E. (2005). Epidemiological studies of pervasive developmental disorders. In F. R. Volkmar, R. Paul, A. Klin, & D. Cohen (Eds.), *Handbook of autism and pervasive developmental disorders* (3rd ed., vol. 1, pp. 42–69). Hoboken, NJ: Wiley.

Fombonne, E. (2009). Epidemiology of pervasive developmental disorders. *Pediatric Research, 65,* 591–598. doi:10.1203/PDR.0b013e31819e7203

Freeth, M., Bullock, T., & Milne, E. (2013). The distribution of and relationship between autistic traits and social anxiety in a UK student population. *Autism, 17,* 571–581. doi:10.1177/1362361312445511

Gobbo, K., & Shmulsky, S. (2014). Faculty experience with college students with autism spectrum disorders: A qualitative study of challenges and solutions. *Focus on Autism and Other Developmental Disabilities, 29,* 13–22. doi:10.1177/1088357613504989

Kanne, S. M., Christ, S. E., & Reiersen, A. M. (2009). Psychiatric symptoms and psychosocial difficulties in young adults with autistic traits. *Journal of Autism and Developmental Disorders, 39,* 827–833. doi:10.1007/s10803-008-0688-x

McKeon, B., Alpern, C. S., & Zager, D. (2013). Promoting academic engagement for college students with autism spectrum disorder. *Journal of Postsecondary Education and Disability, 26,* 353–366. Retrieved from https://www.ahead.org/uploads/publications/JPED/jped26_4/JPED26_4_Full%20Document.pdf

Newell, C., & Debenham, M. (2009). Disability, chronic illness and distance education. In P. L. Rogers, G. A. Berg, J. V. Boettcher, C. Howard, L. Justice, & K. D. Schenk (Eds.), *Encyclopedia of distance learning* (2nd ed., vol. 2, pp. 646–654). Hershey, PA: Information Science Reference.

Newschaffer, C. J., Croen, L. A., Daniels, J., Giarelli, E., Grether, J. K., Levy, S. E., . . . Windham, G. C. (2007). The epidemiology of autism spectrum disorders. *Annual Review of Public Health, 28,* 235–238. doi:10.1146/annurev.publhealth.28.021406.144007

Richardson, J. T. E. (2010). Course completion and attainment in disabled students taking courses with the UK Open University. *Open Learning*, *25*, 81–94. doi:10.1080/02680511003787263

Smeeth, L., Cook, C., Fombonne, E., Heavy, L., Rodrigues, L. C., Smith, P. G., & Hall, A. J. (2004). Rate of first recorded diagnosis of autism and other pervasive developmental disorders in United Kingdom general practice, 1988 to 2001. *BMC Medicine*, *2*(39). Retrieved from http://www.biomedcentral.com/content/pdf/1741-7015-2-39.pdf

Taylor, B., Jick, H., & MacLaughlin, D. (2013). Prevalence and incidence rates of autism in the UK: Time trend from 2004–2010 in children aged 8 years. *BMJ Open*, *3*(10), e003219. doi:10.1136/bmjopen-2013-003219

Taylor, M. J. (2005). Teaching students with autistic spectrum disorders in HE. *Education + Training*, *47*, 484–495. doi:10.1108/00400910510626330

Thierfeld Brown, J., Wolf, L. E., & Wenzel, C. (2014). Postsecondary education for students with autism spectrum disorders. In M. Tincani & A. Bondi (Eds.), *Autism spectrum disorder in adolescents and adults: Evidence-based and promising interventions* (pp. 69–90). New York: Guilford Press.

VanBergeijk, E., Klin, A., & Volkmar, F. (2008). Supporting more able students on the autism spectrum: College and beyond. *Journal of Autism and Developmental Disorders*, *38*, 1359–1370. doi:10.1007/s10803-007-0524-8

Van Hees, V., Moyson, T., & Roeyers, H. (2015). Higher education experiences of students with autism spectrum disorder: Challenges, benefits and support needs. *Journal of Autism and Developmental Disorders*, *45*, 1673–1688. doi:10.1007/s10803-014-2324-2

White, S. W., Ollendick, T. H., & Bray, B. C. (2011). College students on the autism

spectrum: Prevalence and associated problems. *Autism, 15*, 683–701. doi:10.1177/1362361310393363

Table l. Prevalence of specific disabilities in Open University students in 2012.

Disability category	*n*
Blind or partially sighted	1,724
Deaf or hard of hearing	1,323
Restricted mobility	4,945
Restricted manual skills (difficulty handling items)	3,052
Impaired speech	534
Dyslexia or other specific learning difficulties	4,961
Mental health difficulties	7,291
Personal care support	977
Fatigue or pain	7,221
Other disabilities	3,205
Unseen disabilities (e.g. diabetes, epilepsy or asthma)	3,530
Autistic spectrum disorder	552

Table 2. Percentage frequency distribution by age of students with different disabilities.

	n	21 or under	22–24 years	25–29 years	30–39 years	40–49 years	50–59 years	60 or over
No declared disability	154,837	10.6	9.3	16.7	28.2	21.2	9.2	4.8
ASDs only	209	37.8	15.3	19.1	18.7	7.7	1.0	0.5
ASDs plus	343	26.5	16.0	16.0	20.4	12.5	7.6	0.9

Table 3. Percentage of women, percentage frequency distribution by prior qualifications and percentage of students receiving financial support in students with different disabilities.

		Prior qualifications			
	Percentage of women	High	Medium	Low	Percentage with financial support
No declared disability	59.3	33.3	37.0	29.6	25.7
ASDs only	27.3	19.1	44.0	36.8	42.6
ASDs plus	41.4	25.7	37.0	37.3	48.4

Table 4. Percentage frequency distribution by subject of study in students with different disabilities.

	No declared disability	ASDs only	ASDs plus
Arts	13.7	13.4	14.9
Business and law	12.0	8.1	8.5
Education	6.4	1.4	2.6
Health and social care	7.3	0.0	3.5
Mathematics and computing	11.1	19.6	16.6
Modern languages	3.4	4.8	3.8
Openings	5.5	5.3	7.3
Science	15.3	15.3	17.8
Social sciences	16.6	18.2	16.0
Technology	8.6	13.9	9.0

Table 5. Percentage of students completing their modules, percentage of completed students passing their modules, and percentage distribution of grades for passed students in students with different disabilities.

			Module grade				
	Percentage complete	Percentage pass	1	2	3	4	Percentage good grades
No declared disability	69.0	92.8	21.2	31.0	30.5	17.3	52.2
ASDs only	66.9	89.7	27.9	39.1	27.9	15.1	57.0
ASDs plus	61.6	90.3	25.7	20.8	36.1	17.4	46.5

Note. Module grades vary from 1 (distinction) to 4 (bare pass). Grades 1 and 2 are ‘good’.

Table 6. Odds ratios of completion, passing and obtaining a good grade in students with ASDs, both unadjusted and adjusted for the effects of age, gender, prior qualifications and financial assistance.

	Unadjusted			Adjusted		
	Complete	Pass	Good grades	Complete	Pass	Good grades
ASDs only	0.91	0.68	1.21	1.04	0.88	1.46
ASDs plus	0.72*	0.72	0.80	0.80*	0.94	0.94

Note. Data show the odds ratio of each outcome in students with ASDs compared with students with no declared disability. *Odds ratios significantly different ($p < .05$) from one.

Word count: 5,829 words