Parental romantic expectations and parent-child sexuality communication in autism spectrum disorders

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Parental romantic expectations and parent–child sexuality communication in autism spectrum disorders

Laura G Holmes, Michael B Himle and Donald S Strassberg

Abstract

This study examined the relationship between core symptoms of autism spectrum disorder, parental romantic expectations, and parental provision of sexuality and relationship education in an online sample of 190 parents of youth 12–18 years of age with a parent-reported diagnosis of autism spectrum disorder. Regression analyses were conducted separately for youth with autism spectrum disorder + parent-reported average or above IQ and youth with autism spectrum disorder + parent-reported below average IQ. For youth with autism spectrum disorder + parent-reported average or above IQ, autism spectrum disorder severity predicted parental romantic expectations, but not parental provision of sexuality and relationship education. For youth with autism spectrum disorder + parent-reported below average IQ, parental romantic expectations mediated the relationship between autism spectrum disorder severity and parent provision of sexuality and relationship education. This supports the importance of carefully considering intellectual functioning in autism spectrum disorder sexuality research and suggests that acknowledging and addressing parent expectations may be important for parent-focused sexuality and relationship education interventions.

Keywords

adolescence, parent–child sexuality communication, puberty, quality of life, relationships, sexual development, sexual health, sexuality, sexuality education

Introduction

Autism spectrum disorders (ASDs) are estimated to affect 1 in 68 youth in the United States (Centers for Disease Control and Prevention, 2014). ASD is a lifelong pervasive developmental disorder, with symptoms typically persisting into adolescence and adulthood (Shattuck et al., 2007). The past decade has witnessed a rapid increase in the number of research studies focused on promoting independence and optimizing quality of life for adults with ASD (Singh et al., 2009). Relatively few studies, however, have focused on sexuality and sexual development (Dewinter et al., 2013; Gougeon, 2010).

Sexuality is a broad concept that extends beyond physical development (e.g. hormonal changes, physical maturation) and sexual behavior (e.g. masturbation, intercourse, sexual contact) to include sexual knowledge, desire and interest, emotional attachment, attitudes, identity, and sexual orientation (World Health Organization (WHO), 2002). An individual's sexual development and expression occur within the context of family, cultural, and community

values that guide their understanding and experience of sexuality and relationships. For many people, sexuality is an important means for interpersonal connection and fulfillment and is associated with both positive mental and physical health outcomes (for a review, see Diamond and Huebner, 2012; Tolman and McClelland, 2011), as well as risks (Brown-Lavoie et al., 2014; Diamond and Huebner, 2012; Mandell et al., 2005). Adolescence is an important stage for sexual socialization and the development of sexual identity (Tolman and McClelland, 2011).

Studies indicate that many individuals with ASD desire and pursue sexual relationships and, like most people,

The University of Utah, USA

Corresponding author:
Michael B Himle, Department of Psychology, The University of Utah, 380 South 1530 East BEHS 502, Salt Lake City, UT 84112, USA.
Email: Michael.himle@utah.edu

engage in a variety of sexual behaviors (Byers et al., 2013; Van Bourgondien et al., 1997). However, they may have more difficulty than others initiating and maintaining romantic relationships (Byers et al., 2013; Howlin et al., 2004), contributing to loneliness and possibly depression for some individuals (Müller et al., 2008). In addition, there appears to be a greater incidence of inappropriate courtship and sexual behavior among people with ASD (Hellemans et al., 2007, 2010; Stokes et al., 2007). Finally, as with all individuals, people with ASD face common sexual health risks (e.g. sexual abuse, unintended pregnancy, HIV/AIDS). All these factors emphasize the importance of promoting sexual health and decision-making skills via sexuality and relationship education.

Parents are a very important source of sexuality and relationship education for youth, including adolescents with disabilities (e.g. Shtarkshall et al., 2007). Experts recommend that parents engage in ongoing, developmentally appropriate sexuality communication beginning in childhood in order to provide a foundation of information about sexual development and healthy sexual decision-making (Murphy and Elias, 2006; Sexuality Information and Education Council of the United States, 2012). However, parents of children with ASD often report that they struggle to know to how to developmentally tailor sexuality communication for their child as well as how and when to introduce sexuality-related topics.

Although little research has directly examined parent–child sexuality communication in families managing ASD, some evidence suggests that young people with ASD are more likely to learn about sexuality from less credible sources compared to typically developing peers. For example, Mehzabin and Stokes (2011) found that 18- to 30-year-old adults with autism and average or above IQ reported that they learned about sexuality from friends and peers or by themselves rather than from their parents. In addition, some participants noted concern about their own basic sexual responses (e.g. erections, wet dreams) and stated that they would benefit from more sexuality and relationship education (Mehzabin and Stokes, 2011). Peers and media are also common sources of sexual knowledge for neurotypical adolescents (Tolman and McClelland, 2011), but research suggests that adolescents and adults with ASD are less likely to endorse having learned romantic knowledge or skills from these sources compared to neurotypical individuals (Stokes et al., 2007). Furthermore, one study found that adults with ASD were less likely than neurotypical adults to report learning about sexual behaviors, contraceptives, or sexually transmitted diseases (STDs) from parents, teachers, or peers (Brown-Lavoie et al., 2014). Together, this research indicates that there is a need for more sexuality and relationship education from credible sources such as parents and schools.

School-based sexuality and relationship education programs may be a credible source of information and skills (McKay, 2004). Wilkenfeld and Ballan (2011) interviewed personnel at programs for children and adults with developmental disabilities and found that educators generally viewed sexuality as a right and described the value of providing sexuality education, specifically beginning by the start of middle school. However, teachers also perceived sexuality education as being outside of their role and area of expertise. To our knowledge, research has yet to examine the extent to which youth with ASD are included in or benefit from traditional school-based sexuality and relationship education or whether schools regularly adapt such curricula to meet the needs of students with ASD. Given this, parents may be the best source of sexuality information for individuals with ASD at present.

The difficult task of communicating about sexuality with children is not unique to ASD. It is not uncommon for parents of *typically* developing children to report that they delay or neglect talking to their child about sex due to discomfort, perceived inadequate or inaccurate knowledge, and uncertainty about how or when to introduce topics (Croft and Asmussen, 1992). However, introducing and communicating about sexuality-related topics may be even more complicated (and important) for parents of youth with ASD due to discrepancies between chronological age and developmental age or inconsistent performance across domains of functioning. In addition, given that sexual development occurs within a sociocultural context, sexuality is inherently social even for individuals who engage only in solitary sexual activity, and healthy sexual relationships require communication. Communication and social interaction skills are two areas in which individuals with ASD often struggle, and their difficulties with understanding emotions, intentions, and social cues make sexuality and relationship education complicated for parents. Indeed, parents of youth with ASD have reported needing guidance to effectively provide sexuality and relationship education, but rarely receiving such guidance from schools, healthcare providers, or other sources within their communities (Ballan, 2012; Holmes et al., 2014; Nichols and Blakeley-Smith, 2010).

While there are likely to be similarities in the reasons that parents of youth with and without ASD choose to avoid or engage in parent–child sexuality communication, there are also important differences. One important area is parental expectations. Parents of children with ASD may hesitate to engage in parent–child sexuality communication if they do not expect that their child will develop sexual relationships and/or if they do not expect that their child will need or benefit from sexuality and relationship education. For example, Ivey (2004) surveyed 25 caregivers of individuals with mild, moderate, and severe ASD and asked them to rate the likelihood that their child would achieve personal, vocational, and community outcomes. Parents reported on a sample of children and adolescents (age range = 4–20 years). Parents rated "get married" and

"have their own children," as among the least likely outcomes for their child. However, the study did not examine the expectations for sexuality per se, nor did it examine the relationship between child factors (e.g. ASD severity, specific ASD characteristics) and parental expectations, or the relationship between parental expectations and parental actions (e.g. provision of sexuality and relationship education).

In another study, Ballan (2012) conducted semi-structured qualitative interviews with 18 parents of children with ASD (aged 6–13 years) and found that child characteristics (e.g. difficulty with reciprocal social interaction, lack of current social relationships, sensory hypersensitivity) contributed to parents' low expectations regarding whether their child would ever have a sexual relationship, and to parent attitudes about parent–child sexuality communication. Some parents believed that broad-ranging sexuality and relationship discussions would be irrelevant for their child, or even cruel. Parents reported that their sexuality-related discussions with their child generally included topics related to safety and social acceptance (e.g. sexual abuse prevention and hygiene) and did not include topics focused on the child's future social and sexual behaviors (e.g. dating, intercourse, birth control; Ballan, 2012). Although not directly measured, the results suggest that parental expectations for their child's future opportunities for sexual relationships affected their choice of what sexual topics, if any, to cover. Similarly, Ruble and Dalrymple (1993) found that parents of children with higher verbal abilities were more likely to believe that their child would benefit from sexuality and relationship education and also were more likely to report that their child had received sexuality and relationship education. However, it was unclear whether this question referred to their child's cognitive capacity to benefit from instruction, or the general relevance of sexuality and relationship education for their child due to potentially limited opportunities for sexual relationships.

In a follow-up to these studies, we surveyed 198 parents of adolescents with ASD about topics covered during parent–child sexuality communication with their child (Holmes and Himle, 2014). Parents reported on adolescents who were 86.8% male, with a mean age of 14.5 years (range = 12–18 years). In a preliminary report on our survey, we reported that the most commonly endorsed topics for parents of youth with ASD and parent-reported average or above IQ were privacy and private body parts (98.5% and 96.9%), what kinds of touch are okay or not okay (95.4%), hygiene (93.1%), topics that are okay to discuss in public versus private settings (91.5%), and male puberty (91.5%). Topics that were least likely to be endorsed by parents of youth with ASD and parent-reported average or above IQ were sexual activities other than intercourse (29.2%), symptoms of STDs (27.1%), how to use a condom (19.5%), and how to choose a method of birth control

(14.7%). Most commonly endorsed topics for parents of youth with ASD and parent-reported below average IQ were very similar and included private body parts and privacy (94.7 and 89.5%), what kinds of touch are okay or not okay (91.2%), hygiene (89.5%), and public versus private discussion topics (67.9%). In contrast, least commonly endorsed topics for parents of youth with ASD and parent-reported below average IQ differed from those of parents of youth with ASD and parent-reported average or above IQ. Parents of youth with ASD and parent-reported below average IQ were least likely to endorse having covered how to ask someone on a date (21.1%), how to make decisions about whether to have sex (19.3%), how well birth control can prevent pregnancy (14.3%), and how to use a condom (10.5%).

As expected, parents of youth with ASD and parent-reported below average IQ covered fewer topics than parents of youth with ASD and parent-reported average or above IQ. Several interesting trends emerged among predictors of the number of sexuality-related topics that parents reported having covered with their child. For youth with ASD and parent-reported average or above IQ, but not youth with ASD and parent-reported below average IQ, parents of older adolescents covered a greater number of topics than parents of younger adolescents, perhaps because parents of youth with ASD and parent-reported below average IQ did not perceive sophisticated topics as being relevant for their child. Additionally, among youth with ASD and parent-reported average or above IQ, specific ASD symptom profiles (as measured by the Social Responsiveness Scale, 2nd edition (SRS-2); Constantino and Gruber, 2012) influenced how parents provided sexuality and relationship education for youth. Parents discussed a greater number of topics with youth who had better social cognition skills (e.g. the ability to decode social cues) and higher social motivation. Overall ASD symptom severity did not predict the number of sexuality-related topics covered for either youth with parent-reported average or above IQ or those with below average IQ. Previous research indicated that parental romantic expectations (PRE) for their child are related to both ASD symptoms and parental engagement in parent–child sexuality communication (Ballan, 2012). Thus, the relationship between ASD symptom severity and number of sexuality-related topics discussed by parents might have been mediated by the influence of PRE, which is the hypothesis explored in this article.

Given the importance of developmentally tailored sexuality communication, more research is needed to understand what factors affect parent–child sexuality communication for youth with ASD. This study examined whether PRE were related to parent–child sexuality communication. We predicted that (a) greater ASD symptom severity would be associated with lower PRE

and (b) lower PRE would be associated with fewer sexuality-related topics discussed by parents. In addition, we tested whether PRE mediated the relationship between ASD symptom severity and number of sexuality-related topics parents reported having covered with their child. Finally, we explored how specific autism symptoms affected PRE.

Methods

The "Methods" section is fundamentally the same as reported in Holmes and Himle (2014) and has been provided here along with additional descriptive details for context. Preliminary analyses of these data as well as tables containing information about the sexual behaviors of youth with ASD and topics covered by parents during parent–child sexuality communication for this sample are available in Holmes and Himle (2014).

Participants

Parents were eligible to participate if they reported that they had an adolescent child (aged 12–18 years) with an ASD diagnosis that had been conferred by a healthcare professional (i.e. a physician, pediatrician, psychiatrist, or psychologist). Parents (N=198) who met these criteria completed the survey. Of these, eight were excluded because they completed only a small portion of the survey. The final sample consisted of 190 participants. Parent demographic information (i.e. gender, ethnicity, marital status, locale, education, income, religiosity) is provided in Table 1. Parents were predominantly Caucasian (88.2%) and female (92%), with a median age of 46 years (M=46.87, standard deviation (SD)=6.41 years). Most parents reported that they were married or cohabiting (78.3%). Child characteristics are provided in Table 2. Parents reported on adolescents who were predominantly Caucasian (89.3%) and male (86.8%), with a median age of 14 years (M=14.5, SD=1.96, range=12–18 years). Parents were asked to report their child's measured IQ (if known, N=167) or to provide an estimated IQ (N=23). On the first question, IQ was presented in terms of standard scores and official descriptive guidelines (e.g. average, slightly below average or borderline, profound mental retardation; American Psychiatric Association (APA), 2000). We expected that some parents would not know their child's IQ score, and we asked parents who indicated "I don't know" on the first question to estimate their child's overall level of cognitive functioning based on the same descriptive guidelines. Per parent report, 68.9% of the adolescents fell in the average or above average range (IQ=86–116+), 12.6% had slightly below average or borderline IQ (71–85), 8.4% had below average IQ or mild intellectual disability (56–70), 4.7% had far below average IQ or moderate intellectual disability (41–55), and 5.2% had severe or profound intellectual disability (IQ ⩽ 40).

For the purposes of this study, we conducted analyses with the combined sample and subsequently with separate samples of parents of adolescents with ASD + parent-reported average or above IQ (N=131, 68.9%) and parents of adolescents with ASD + parent-reported below average IQ (N=59, 31.1%). As reported in Holmes and Himle (2014), adolescents in these groups did not differ on age (t(188)=0.383, p=0.702; $M_{AVERAGE+}$=14.54, SD=1.95 and $M_{BELOWAVERAGE}$=14.42, SD=2.00) or gender (χ^2(1, N=190)=0.012, p=0.913). Most adolescents (68.6%) attended mainstream public school and all adolescents lived at home with their parents. According to parent report, the majority of adolescents (90.4%) had begun to show signs of puberty. ASD symptoms were measured using the SRS-2 (see below). SRS-2 Total Standard Scores (T-scores) ranged from 55 to 90 (M=78.49, SD=9.23), which is consistent with a diagnosis of ASD (see Table 3). Most youth (64.7%) fell within the "Severe" range, with others falling within the moderate range (24.7%), mild range (7.4%), or just below the threshold for diagnosis (3.2%). As reported in Holmes and Himle (2014), youth with ASD + parent-reported below average IQ had significantly higher SRS-2 total T-scores than youth with ASD + parent-reported average or above IQ (t(188)=−2.245, p=0.026; $M_{AVERAGE+}$=77.50, SD=9.34; $M_{BELOWAVERAGE}$=80.71, SD=8.67). Additionally, youth with ASD + parent-reported below average IQ had higher scores than youth with ASD + parent-reported average or above IQ for social communication (t(188)=−2.466, p=0.015, $M_{AVERAGE+}$=76.37, SD=9.02; $M_{BELOWAVERAGE}$=79.78, SD=8.38) and repetitive behavior (t(137.39)=−3.249, p=0.001, $M_{AVERAGE+}$=75.47, SD=11.04; $M_{BELOWAVERAGE}$=80.78, SD=8.87).

Procedures

Participants were recruited through local and national autism support groups in the United States in 2012–2013 via electronic postings inviting them to complete an anonymous online survey about ASD and sexuality education. Once parents completed the survey, they were entered into a raffle for 10 $40 gift cards and could elect to receive a list of resources about ASD and sexuality.

Measures

Online sexuality survey. Parents completed a 50-item survey that included questions about parent and child demographics, PRE for their child, and finally about parent–child sexuality communication. In the PRE section (based on Mutua and Dimitrov, 2001), parents rated the likelihood of six outcomes (e.g. go on dates, fall in love, have a healthy sexual relationship) on a 5-point Likert-type scale (1="Very unlikely" to 5="Very likely"). For each parent, likelihood ratings were summed to create a PRE variable (PRE; range=0–25), with a higher score indicating higher

Table 1. Parent demographic variables (*N* = 190ᵃ).

	N (%)
Gender	
Male	15 (8.0)
Female	172 (92.0)
Ethnicity	
American Indian/Alaskan native	4 (2.1)
Asian	5 (2.7)
Black/African American	1 (0.5)
Hispanic	6 (3.2)
Multiracial	5 (2.7)
Native Hawaiian/Pacific Islander	1 (0.5)
White	165 (88.2)
Marital status	
Single	7 (3.7)
Long-term relationship/cohabiting	7 (3.7)
Cohabiting	3 (1.6)
Married	145 (76.7)
Divorced/separated	24 (12.7)
Widowed	3 (1.6)
Locale	
Urban	30 (16.0)
Suburban	128 (68.4)
Rural	29 (15.5)
Education	
Junior high	2 (1.1)
High school/GED	10 (5.3)
Some college	30 (15.9)
Associate degree/vocational school	17 (9.0)
Bachelor's degree	71 (37.6)
Master's degree	46 (24.3)
Professional or doctoral degree	13 (6.9)
Current religiosity	
Not at all	27 (14.6)
Not very	52 (28.1)
Moderately	67 (36.2)
Very	39 (21.1)
Participation in ASD support group	
Yes, I actively participate	93 (49.5)
No, I do not actively participate	95 (50.5)
Median age (range), years	46 (33–63)
Median income (range)	80,000–89,999 (0–140,000+)

GED: General Educational Development; ASD: autism spectrum disorder.
ᵃNot all participants answered all questions (range = 187–190).

expectations. Next, in the parent–child sexuality communication section, parents reviewed a list of 39 sexuality-related topics (see Appendix 1) and endorsed those that they believed they had covered with their child. Topics included privacy, sexual abuse prevention, physical development of boys and girls, reproduction, pregnancy and STD prevention, sexual decision-making, relationships, consent and coercion, and sexual health and were adapted from Beckett et al. (2009), Koller (2000), Nichols and Blakeley-Smith (2010), Travers and Tincani (2010), and

Wolfe et al. (2009). Responses were summed to create a number of sexuality topics covered (NSTC) variable for each parent (range = 0–39).

SRS-2 parent report. The SRS-2 is a 65-item rating scale intended to measure the severity of ASD symptoms with an emphasis on social impairment (Constantino and Gruber, 2012). It provides a total *T*-score indicating overall symptom severity and impairment as well as several subscale *T*-scores (i.e. Social Motivation, Social Cognition,

Table 2. Child demographic variables ($N = 190^a$).

	N (%)
Gender	
Male	165 (86.8)
Female	25 (13.2)
Ethnicity	
American Indian/Alaskan native	1 (0.5)
Asian	2 (1.1)
Black/African American	1 (0.5)
Hispanic	1 (0.5)
Multiracial	15 (8.0)
White	167 (89.3)
Diagnosis	
Asperger's syndrome	84 (44.4)
Autism	60 (31.7)
PDD	19 (10.1)
More than one selected	26 (13.8)
Parent-reported IQ	
Average or above IQ	131 (68.9)
Below average IQ	59 (31.1)
Type of school attended	
Mainstream public school	129 (68.6)
Private school	13 (6.9)
Homeschooled	17 (9.0)
Therapeutic school	20 (10.6)
Charter school	8 (4.3)
College	1 (0.5)
Started puberty	
Yes	170 (90.4)
No	18 (9.6)
Median age (range), years	14 (12–18)
Median age at diagnosis (range), years	6.5 (2–18)
Median age at puberty (range), years	12 (9–17)

PDD: pervasive developmental disorder.

^{a}Not all participants answered all questions (range = 187–190).

Social Awareness, Social Communication, and Repetitive Behavior). *T*-scores of 60–75 are typical for people with mild or "high functioning" ASD and suggest deficits in reciprocal social behavior that are likely to cause clinically significant interference in everyday social interactions. The measure has well-established psychometric properties (Constantino and Gruber, 2012).

Analytic plan

Multiple and simple linear regression analyses were conducted to determine whether SRS-2 total *T*-score, child age, and child gender predicted PRE and number of sexuality-related topics covered (NSTC). Analyses were conducted on the sample as a whole, and then separately for samples of youth with ASD + parent-reported average or above IQ and ASD + parent-reported below average IQ. In a previous study using these data, gender did not predict

NSTC for either group, so gender was not included as a predictor of NSTC in the following analyses (Holmes and Himle, 2014).[1] However, no previous analyses with PRE have been conducted, and therefore gender was controlled for in analyses of the relationship between SRS-2 total *T*-score and PRE.

Results

Prior to conducting analyses, all variables were inspected to ensure normality in the combined sample and in the ASD + parent-reported above average IQ and ASD + parent-reported below average IQ samples. NSTC from the total sample ranged from 0 to 39 ($M = 19.3$, $SD = 10.36$). Parent responses to PRE questions are located in Table 4. Total PRE scores for the total sample (ASD + parent-reported average or above IQ and ASD + parent-reported below average IQ) ranged from 6 to 30 ($M = 18.27$, $SD = 6.26$). Parents of youth with ASD + parent-reported average or above IQ reported significantly higher romantic expectations than parents of youth with ASD + parent-reported below average IQ ($t(184) = 5.631$, $p = 0.001$; $M_{\text{AVERAGE+}} = 21.95$, $SD = 9.58$; $M_{\text{BELOWAVERAGE}} = 13.35$, $SD = 9.64$).

Combined sample

For the combined sample, autism severity (measured by SRS-2 total *T*-score; $B = 0.005$, standard error (SE) = 0.086, $p = 0.950$) did not predict the number of sexuality topics that parents covered ($F(3,183) = 1.917$, $p = 0.150$, $R^2 = 0.021$) after controlling for child age ($B = 0.144$, $SE = 0.396$, $p = 0.057$). However, SRS-2 total *T*-score did predict PRE score ($B = -.360$, $SE = 0.050$, $p = 0.005$) after controlling for child age ($B = -.130$, $SE = 0.226$, $p = 0.071$) and gender ($B = 0.027$, $SE = 0.1281$, $p = 0.701$), such that parents of adolescents with more severe ASD symptoms had lower romantic expectations for their child ($F(3,182) = 8.838$, $p = 0.005$, $R^2 = 0.127$). Additionally, PRE scores predicted NSTC ($B = 0.360$, $SE = 0.115$, $p = 0.005$) such that parents with greater romantic expectations for their child discussed a greater number of sexuality-related topics ($F(1,181) = 26.908$, $p = 0.005$, $R^2 = 0.129$). Contemporary understanding of mediation models indicates that it is possible for a mediating variable to suppress the direct effect of a causal variable on the outcome variable. Consistent with this, we hypothesized that inconsistent mediation was occurring, meaning that PRE were partially mediating and suppressing the relationship between autism symptom severity and number of sexuality-related topics covered by parents (Hayes, 2009; MacKinnon et al., 2007).

Using PROCESS (Hayes, 2013), a mediation analysis was conducted for the total sample of parents to test the effect of PRE score on parental provision of sex education

Table 3. Social Responsiveness Scale-2 scores ($N = 190$[a,b]).

	Combined sample	ASD + average IQ ($N = 131$)	ASD + below average IQ ($N = 59$)
	Mean (SD)	Mean (SD)	Mean (SD)
Total	78.49 (9.23)	77.50 (9.34)	80.71 (8.67)
Awareness	73.48 (10.11)	72.73 (10.38)	75.17 (9.33)
Cognitive	75.66 (9.38)	74.94 (9.78)	77.27 (8.28)
Communication	77.43 (8.95)*	76.37 (9.02)	79.78 (8.38)
Motivation	71.34 (11.91)	71.44 (11.14)	71.14 (13.55)
Repetitive behavior	77.12 (10.68)*	75.47 (11.04)	80.78 (8.87)
Interpretive guidelines	N (%)	N (%)	N (%)
Below threshold	6 (3.2)	5 (3.8)	1 (1.7)
Mild	14 (7.4)	11 (8.4)	3 (5.1)
Moderate	47 (24.7)	33 (25.2)	14 (23.7)
Severe	123 (64.7)	82 (62.6)	41 (69.5)

ASD: autism spectrum disorder; SD: standard deviation.
[a]Participants endorsed the degree to each question characterized their child on a 4-point Likert-type scale ("Not true" to "Almost always true").
[b]Significant differences between groups noted with an *.

Table 4. Parental romantic expectations (PRE; $N = 190$[a]).

My child will …	n (%)				
	Very unlikely	Somewhat unlikely	Slightly likely	Likely	Very likely
Youth with ASD + average or above IQ					
… experience sexual desire for others	2 (1.5)	9 (6.9)	24 (18.5)	**51 (39.2)**	44 (33.8)
… go on dates	8 (6.1)	24 (18.3)	**46 (35.1)**	38 (29.0)	15 (11.5)
… fall in love	6 (4.6)	17 (13.0)	36 (27.5)	**54 (41.2)**	18 (13.7)
… have a healthy sexual relationship	9 (6.9)	28 (21.4)	**45 (34.4)**	40 (30.5)	9 (6.9)
… get married or find a life partner	7 (5.4)	26 (20.2)	39 (30.2)	**44 (34.1)**	13 (10.1)
… have children	13 (9.9)	27 (20.6)	**43 (32.8)**	39 (29.8)	9 (6.9)
Youth with ASD + below average IQ					
… experience sexual desire for others	9 (15.5)	7 (12.1)	11 (19.0)	**20 (34.5)**	11 (19.0)
… go on dates	**20 (33.9)**	10 (16.9)	13 (22.0)	13 (22.0)	3 (5.1)
… fall in love	**19 (32.2)**	11 (18.6)	10 (16.9)	13 (22.0)	6 (10.2)
… have a healthy sexual relationship	**27 (46.6)**	6 (10.3)	17 (29.3)	5 (8.6)	3 (5.2)
… get married or find a life partner	**29 (50.0)**	4 (6.9)	16 (27.6)	6 (10.3)	3 (5.2)
… have children	**32 (55.2)**	6 (10.2)	15 (25.9)	3 (5.2)	2 (3.4)

ASD: autism spectrum disorder.
Modal response indicated in bold.
[a]Not all participants answered all questions (range $N = 187–189$).

(NSTC) via ASD symptom severity (SRS-2 total T-score; see Figure 1). Child age and gender did not predict PRE scores or NSTC, so they were not included in the model as covariates. A bootstrapping analysis ($N = 183$, 1000 bootstrap resamples) was performed following methods described by Preacher and Hayes (2008) for estimating direct and indirect effects. Seven cases were deleted in a listwise fashion due to missing data. Our analysis showed, with 95% confidence, that the total indirect effect (i.e. the difference between the total and direct effects) of SRS-2 total T-score on NSTC through the mediator was significant, with a point estimate of $-.1536$ and a 95% biased confidence interval (CI) of $-.2584$ to $-.0745$. Thus, PRE mediated the relationship between SRS-2 total T-score and the number of sexuality-related topics covered by parents ($F(2,180) = 14.088$, $R^2 = 0.135$, bootstrapped 95% CI of indirect effects $= [-.2584, -.0745]$, Beta $= -.1536$, $SE = 0.0842$).
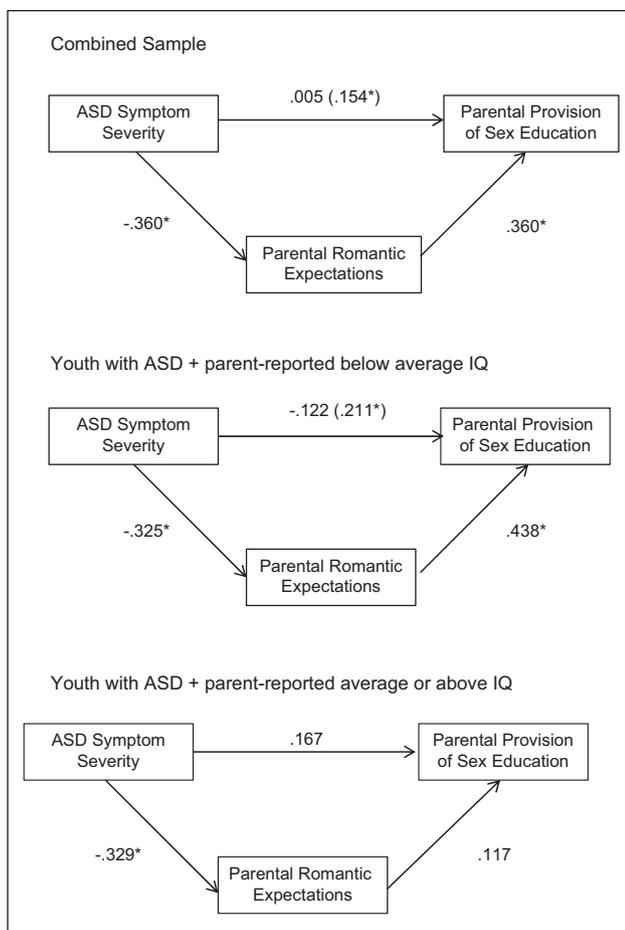
Figure 1. Model illustrating the mediation paths for the combined sample (top panel), ASD + parent-reported below average IQ (middle panel), and ASD + parent-reported average or above IQ (bottom panel) between ASD severity, parental romantic expectations for their child, and number of sex-related topics covered by parent.
Point estimate in parentheses reflects the indirect effect of ASD symptom severity on number of sex-related topics covered by parent.
*$p < 0.05$.

Given the differences in PRE scores and NSTC scores for youth with ASD + parent-reported below average IQ and ASD + parent-reported average or above IQ, we proceeded to run these analyses separately in each sample.

Parents of youth with ASD + parent-reported below average IQ

The results for youth with ASD + parent-reported below average IQ were similar to the results in the whole sample. As reported in Holmes and Himle (2014), SRS-2 total *T*-score ($B = -.122$, $SE = 0.158$, $p = 0.367$) did not predict NSTC ($F(2,53) = 0.940$, $p = 0.397$, $R^2 = 0.034$) after controlling for child age ($B = 0.123$, $SE = 0.646$, $p = 0.364$). However, in this study, we found that SRS-2 score did predict PRE score ($B = -.325$, $SE = 0.105$, $p = 0.014$) after controlling for child age ($B = -.025$, $SE = 0.422$, $p = 0.842$) and

gender ($B = 0.144$, $SE = 2.456$, $p = 0.265$), such that parents of adolescents with more severe ASD symptoms had lower romantic expectations for their child ($F(3,54) = 3.042$, $p = 0.037$, $R^2 = 0.145$). Additionally, PRE score predicted NSTC ($B = 0.438$, $SE = 0.178$, $p = 0.001$) such that parents with greater romantic expectations for their child discussed a greater number of sexuality-related topics ($F(1,55) = 13.037$, $p = 0.001$, $R^2 = 0.192$).

Given that the pattern of the results was the same as those from the sample as a whole, a mediation analysis was conducted for parents of youth with ASD + parent-reported below average IQ to test the effect of PRE on parental provision of sexuality and relationship education via ASD symptom severity (SRS-2 total *T*-score; see Figure 1; Hayes, 2009). Child age and gender did not predict PRE scores or NSTC for youth with ASD + parent-reported below average IQ, so they were not included in the model as covariates. A bootstrapping analysis ($N = 57$, 1000 bootstrap resamples) was performed; two cases were deleted in a listwise fashion due to missing data. Our analysis showed, with 95% confidence, that the total indirect effect (i.e. the difference between the total and direct effects) of SRS-2 total *T*-score on NSTC through the mediator was significant, with a point estimate of $-.2109$ and a 95% biased CI of $-.4891$ to $-.0498$. Thus, PRE mediated the relationship between SRS-2 total *T*-score and the number of sexuality-related topics covered by parents ($F(2,54) = 6.4647$, $R^2 = 0.193$, bootstrapped 95% CI of indirect effects = $[-.4891, -.0498]$, Beta = $-.2109$, $SE = 0.1115$).

Given that SRS-2 total *T*-score predicted PRE score, we conducted further analyses to determine which of the SRS-2 subscale scores best predicted PRE when controlling for child age. The predictor that accounted for the greatest amount of variance in PRE was social awareness ($B = -.435$, $SE = 0.088$, $p = 0.001$, $F(2,55) = 6.612$, $p = 0.003$, $R^2 = 19.4$), with greater social awareness deficits predicting lower PRE when controlling for age ($B = 0.040$, $SE = 0.403$, $p = 0.745$). Similarly, higher scores on restricted interests and repetitive behavior predicted lower PRE ($B = -.338$, $SE = 0.104$, $p = 0.010$, $F(2,55) = 3.743$, $p = 0.030$, $R^2 = 12.0$) when controlling for age ($B = 0.069$, $SE = 0.420$, $p = 0.588$). In contrast, social cognition did not significantly predict PRE ($B = -.168$, $SE = 0.112$, $p = 0.214$, $F(2,55) = 0.945$, $p = 0.395$) when controlling for age ($B = 0.053$, $SE = 0.444$, $p = 0.696$). Nor did social communication predict PRE ($B = -.312$, $SE = 0.108$, $p = 0.021$, $F(2,55) = 2.992$, $p = 0.058$) when controlling for age ($B = 0.008$, $SE = 0.435$, $p = 0.954$). Finally, social motivation did not predict PRE ($B = -.251$, $SE = 0.066$, $p = 0.059$, $F(2,55) = 2.022$, $p = 0.142$) when controlling for age ($B = 0.064$, $SE = 0.432$, $p = 0.623$).

Youth with ASD + parent-reported average or above IQ

For youth with ASD + parent-reported average or above IQ, higher SRS-2 total *T*-score predicted lower PRE score

$(B=−.329, SE=0.051, p=0.005)$ after controlling for child age $(B=−.235, SE=0.237, p=0.009)$ and gender $(B=−.037, SE=1.317, p=0.666)$. This model accounted for 11.6% of the variance in PRE scores $(F(3,124)=5.445, p=0.002)$. However, PRE score did not predict NSTC $(B=0.117, SE=0.165, p=0.192; F(1,124)=1.717, p=0.192)$. Likewise, as reported in Holmes and Himle (2014), SRS-2 total T-score $(B=0.167, SE=0.093, p=0.069)$ did not predict NSTC $(F(2,126)=3.234, p=0.043, R^2=0.049)$ when controlling for child age $(B=0.203, SE=0.444, p=0.027)$.[2]

Once again, we conducted further analyses to determine which of the SRS-2 subscale scores best predicted PRE when controlling for child age. Of the five subscale scores, only social cognition did not predict PRE $(B=−.135, SE=0.049, p=0.133; F(2,125)=2.392, p=0.096)$. Perhaps not surprisingly, the predictor that accounted for the greatest amount of variance in PRE was social motivation $(B=−.309, SE=0.040, p=0.005; F(2,125)=7.937, p=0.001, R^2=11.3)$, with higher social motivation scores predicting lower PRE when controlling for age $(B=−.184, SE=0.228, p=0.032)$. Similarly, higher social communication scores predicted lower PRE $(B=−.299, SE=0.051, p=0.001; F(2,125)=7.228, p=0.001, R^2=10.4)$ when controlling for age $(B=−.211, SE=0.233, p=0.017)$. Next, higher social awareness scores predicted lower PRE $(B=−.239, SE=0.046, p=0.009; F(2,125)=4.818, p=0.010, R^2=7.2)$ when controlling for age $(B=−.209, SE=0.241, p=0.022)$. Finally, higher scores on restricted interests and repetitive behaviors predicted lower PRE $(B=−.203, SE=0.043, p=0.026; F(2,125)=3.800, p=0.025, R^2=5.7)$ when controlling for age $(B=−.196, SE=0.242, p=0.032)$.

Discussion

Parent–child sexuality communication is important for fostering healthy relationships and promoting healthy sexuality for all youth, including those with ASD. For parents of youth with ASD, however, engaging in sexuality communication is complicated by ASD symptoms and related developmental deficits (e.g. cognitive and/or social deficits, restricted and repetitive interests, and fixations). Recent research suggests that individuals with ASD may not be receiving effective sexuality and relationship education from their parents or other credible sources (Brown-Lavoie et al., 2014; Mehzabin and Stokes, 2011). To date, there have been few empirical studies examining factors related to parent–child sexuality communication in ASD. However, qualitative research has suggested that both ASD severity and PRE play a primary role in whether parents communicate about sexuality with youth with ASD as well as what topics they choose to cover. It has been suggested that because of their child's symptoms, parents of youth with ASD have uncertain or low expectations about whether their child will fall in love, marry, or have a sexual

relationship and that this, in turn, affects the extent to which parents provide comprehensive sexuality and relationship education to their child (Ballan, 2012; Nichols and Blakeley-Smith, 2010; Ruble and Dalrymple, 1993). The purpose of this study was to examine factors related to parent–child sexuality communication with parents of youth with ASD.

This study examined the relationships between overall ASD severity, PRE, and the number of sexuality-related topics that parents reported having covered with their child. In a preliminary study using this sample, we previously reported that there was no direct association between overall ASD severity and number of sexuality-related topics covered (Holmes and Himle, 2014), although parents of youth with ASD + parent-reported below average IQ discussed fewer topics than parents of youth with ASD + parent-reported average or above IQ. However, in a recent qualitative study, parents indicated that their child's ASD symptoms lead them to believe that romantic relationships and partnered sexual activity might not be possible for their child, and that this lead to their being less engaged in parent–child sexuality communication (Ballan, 2012). As anticipated, in this study, we found that parents of youth with more severe ASD symptoms had lower romantic expectations for their child, regardless of IQ. However, the relationship between PRE and number of sexuality-related topics parents reported having covered differed for youth with ASD + parent-reported below average IQ and ASD + parent-reported average or above IQ. For youth with ASD + parent-reported average or above IQ, PRE did not affect the number of sexuality-related topics covered. In contrast, parents of youth with ASD + parent-reported below average IQ who expected their child to have healthy sexual relationships covered a greater number of topics during parent–child sexuality communication than parents who did not have high romantic expectations for their child. Furthermore, for these parents, romantic expectations partially accounted for the relationship between their child's ASD severity and how many topics they covered during parent–child sexuality communication.

There are several possible explanations for these findings. First, that parental expectations did not predict the number of sexuality-related topics covered for youth with ASD + parent-reported average or above IQ might suggest that romantic expectations do not play a significant role in parental provision of sexuality and relationship education for these adolescents. Previous research within the developmental disabilities literature has shown that parental expectations in other areas (e.g. civic or vocational expectations) predict whether parents provide relevant educational opportunities to their child (e.g. Alexander et al., 1994; Davis-Kean, 2005; Mutua and Dimitrov, 2001; Neuenschwander et al., 2007). Romantic expectations may have less of an impact on the extent to which parents provide sexuality and relationship education, especially if parents are uncertain about what to expect regarding their

child's sexual development and romantic prospects. It is possible that in the absence of clear indications that youth will not engage in romantic relationships, parents of youth with ASD and average cognitive functioning are more hopeful about their child's relationship prospects, while parents of youth with ASD and comorbid intellectual disability recognize a clearer divergence from expectations for normative adult milestones (e.g. driving, education, love, marriage, sex).

Alternatively, parental expectations may influence other important aspects of parent–child sexuality communication. As noted in Holmes and Himle (2014), the outcome measure used in this study was the overall number of sexuality topics parents reported having covered with their child. This method may not have captured important aspects of sexuality and relationship education that were relevant to parental expectations, such as when and how they cover *specific* topics. For example, parents who expect that their child will fall in love, marry, or have a healthy sexual relationship may provide more in-depth information about sexual health and prevention-related topics (e.g. use of birth control and condoms), or might use techniques such as role playing to teach youth how to ask someone out on a date. This is an important area for future research.

In contrast, PRE did influence parent–child sexuality communication for youth with ASD + parent-reported below average IQ. ASD severity had an indirect negative effect on the number of topics covered and romantic expectations mediated this relationship. Parents whose children were more severely affected by ASD had lower romantic expectations and reported having covered fewer sexuality-related topics with their child. This is consistent with our earlier findings from this sample showing that parents of youth with ASD + parent-reported below average IQ typically cover basic topics (e.g. privacy, sexual abuse prevention) but are less likely to cover topics related to relationships and sexual health (Holmes and Himle, 2014). This is an important finding given that many individuals with ASD and comorbid intellectual disability *are* interested in sex, dating, and marriage (Konstantareas and Lunsky, 1997) and engage in sexual activity (Hellemans et al., 2010; Van Bourgondien et al., 1997). It is important that individuals with ASD and comorbid intellectual disability receive effective sexuality and relationship education to prevent negative sexual health outcomes and promote healthy relationships (Brown-Lavoie et al., 2014).

Several limitations to this study warrant discussion. First, this study was based solely on parent report. Research has found inconsistency between parent and youth report about sexuality-related conversations in families raising neurotypical children (DiIorio et al., 2003). Additionally, an important outcome of parent–child sexuality communication is an increase in an individual's objective sexual knowledge. Thus, future research is needed to compare parent and child reports and to examine the relationship between parent–child sexuality communication and youth sexual knowledge for adolescents with ASD. Second, all parents were presented with the PRE measure followed by the parent–child sexuality communication measure. It is possible that answering questions about their romantic expectations for their child may have changed how participants answered questions about how they had prepared their child for these experiences. Ideally, these measures would have been counterbalanced. Third, it is impossible to assess the accuracy of parent-reported measured or estimated IQ in an Internet-based study, and it is recommended that this research be replicated with IQ testing or chart review. However, the results of this study support the importance of including measures of intellectual functioning in studies of family sexuality communication and sexual development.

Additionally, Internet-based surveys have inherent limitations, including the need for participants to have computer access and the lack of control over who participates. Studies involving sexuality are particularly vulnerable to volunteer bias because some people are uncomfortable thinking about sexuality. Thus, people who volunteer for sexuality studies may be more comfortable with sexuality, including talking to their children about sexuality, leading to inflated estimates of how much parent–child sexuality communication is occurring for this population (Strassberg and Lowe, 1995). Additionally, the demographics of the current sample were somewhat restricted and may not reflect the broader population of parents of children with ASD. As noted in Holmes and Himle (2014), participants were predominantly White, married mothers who were well educated (over one-third of participants reported that they had obtained a master's degree or higher) with a high average income. Previous literature indicates that participants with higher education and income levels report more communication about sexuality with their children (DiIorio et al., 2003), so it is possible that the results of this study may overestimate the extent to which parents cover sex-related topics with their children. Furthermore, although only half of participants were actively involved in an ASD support group or organization, all participants were recruited through some connection to such support groups. This suggests that participants may have had more access to resources and support than parents of children with ASD in the general population. This is important in the context of parent–child sexuality communication because parents connected to support groups may make sexuality and relationship education a priority based on conversations with other parents or access to information about the course of ASD in adolescence and adulthood. Given that parent and child gender has been found to affect

parent–child sexuality communication for neurotypical youth (DiIorio et al., 2003), it would be ideal to collect samples in which fathers and daughters were better represented. Although none of the demographic or support variables was related to the primary outcome measure, the results should be interpreted with these sample limitations in mind.

Finally, mediation analyses assume causal processes that unfold over time. This study used cross-sectional rather than longitudinal data to test a mediation model. Although most research on mediation models has tended to use cross-sectional data, cross-sectional mediation analyses are clearly limited in their ability to portray causality, and thus it would be premature to infer causality from this single study (Maxwell and Cole, 2007). Longitudinal research is needed to determine how parent and child characteristics drive sexual and romantic relationships trajectory across the lifespan for individuals with ASD.

Despite these limitations, this study was among the first to directly examine factors related to parental provision of sexuality and relationship education to adolescents with ASD, which is a growing area of interest and concern for researchers, professionals, parents, as well as teens and adults living with ASD. This study used quantitative methods to replicate the findings of qualitative research, collected one of the largest samples to date in studies of ASD and sexuality, and conducted separate analyses for youth with ASD + parent-reported below average IQ and those with ASD + parent-reported average or above IQ. The findings indicate that IQ and adaptive skills are likely to be an important predictor or moderator in research on ASD, sexuality, and relationships. Whenever possible, researchers should include intellectual functioning in their analyses and be cautious when using heterogeneous samples. ASD presents a complicated clinical picture and more predictive precision would be beneficial for parents, caregivers, and teachers attempting to meet the interpersonal and sexual health-related needs of individuals with ASD.

Parent–child sexuality communication is important for the transmission of information, values, and sexual decision-making skills for all individuals, including those with ASD, and should be encouraged. Treatment providers and caregivers who wish to promote sexual health for individuals with ASD and comorbid intellectual disability may find it helpful to acknowledge and address PRE. Furthermore, parent–child sexuality communication is beneficial even for those individuals who do not eventually fall in love, get married, or have children. For example, recent research suggests that adults with ASD who have greater sexual knowledge are less likely to be sexually victimized (Brown-Lavoie et al., 2014). Thus, it is important for healthcare professionals to encourage and support parents as they engage in parent–child sexuality communication with individuals across the autism spectrum regardless of their expectations.

Notes

1. To determine whether results would differ for a male-only sample, we conducted analyses excluding female adolescents. This resulted in no significant changes for the combined, ASD + parent-reported below average IQ, or ASD + parent-reported average or above IQ samples.

2. To determine whether participants whose child received a "normal range" SRS-2 total T-score were affecting results, we conducted analyses without these participants included in the sample for the combined and IQ stratified samples. There were no differences in results for the combined or ASD + parent-reported below average IQ samples. In contrast, for youth with ASD + parent-reported average or above IQ, SRS-2 total T-score did predict NSTC ($B = 0.188$, $SE = 0.104$, $p = 0.042$, $F(2,121) = 3.256$, $p = 0.042$, $R^2 = 0.051$) when controlling for child age ($B = 0.179$, $SE = 0.459$, $p = 0.052$). Best practices dictate that mediation analyses would not be appropriate based on these results.

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Appendix 1

Sexuality topics

Privacy

Privacy (e.g. knocking before entering rooms, undressing in private)

Private body parts

Public and private discussion topics

Sexual abuse prevention/consent

What kinds of touch are okay/not okay

How to report sexual abuse

How to say no if someone wants to have sex and your child does not

The importance of not pressuring other people to have sex

Puberty/reproduction

Hygiene (e.g. washing genitals)

How boys' bodies change physically as they grow up

Wet dreams

How girls' bodies change physically as they grow up

Menstruation (menstrual periods)

How women get pregnant and have babies

Relationships

What qualities are important in choosing close friends

Dating and marriage

How to ask someone out on a date

How your child will know whether s/he is in love

How to deal with romantic rejection

How your child will make decisions about whether to have sex

Family types and roles

Parenting

Sexual health/prevention

The necessity of regular exams by themselves/with doctors (e.g. Pap, breast and testes exams)

Reasons why your child should not have sex

Consequences of getting pregnant/getting someone pregnant

How well birth control can prevent pregnancy

How to choose a method of birth control

Symptoms of sexually transmitted diseases (STDs)

How people can prevent getting STDs

How well condoms prevent STDs

How to use a condom

What to do if a partner does not want to use a condom

Sexuality

Sexual slang terms that people might use

Homosexuality/people being gay

Sexuality as a positive aspect of self

Masturbation (e.g. is it okay? When/where it is appropriate)

What it feels like to have sex

Sexual activities other than intercourse

Sexual or romantic differences/difficulties that might result from ASD

Reasons why people like to have sex