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Physical Disabilities and Low Cognitive Ability Increase Risk of Minor Sex Exchange among Adolescent Males in the United States

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Abstract

Disability is a well-established risk factor for sexual violence victimization among both male and female children. Some research indicates that adolescent females with disabilities are at higher risk of experiencing minor sex exchange (a form of minor sex trafficking victimization) compared to females without disabilities, but there is a dearth of similar research among adolescent males. This study investigates whether physical disability and low cognitive ability are related to sex exchange among minor adolescent males. This cross-sectional analysis using data from a nationally representative cohort study, The National Longitudinal Study of Adolescent to Adult Health (Add Health), included 4,401 male participants who were age 18 or younger at Wave II. Unadjusted and adjusted logistic regression models estimated the odds of adolescent experiences of sex exchange by physical disability and cognitive ability. Both severe physical disability and low cognitive ability in adolescent males were significantly associated with increased odds of exchanging sex, results similar to those found in studies of adolescent females. Because of these associations for both males and females, disability should be taken into account when designing and implementing prevention and intervention programs related to sex trafficking. These results underscore the importance of addressing system-wide gaps contributing to the relationship between disability and the involvement of minors in commercial sex exchange.

Keywords: minor, sex exchange, disability, physical, cognitive, adolescence, trafficking

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Introduction

The United Nations defines commercial sexual exploitation of children (CSEC) as “any actual or attempted abuse of a position of vulnerability, differential power, or trust for sexual purposes including but not limited to profiting monetarily, socially, or politically”, and sex trafficking of minors (those under age 18) is considered to be a form of CSEC (Greenbaum & Crawford-Jakubiak, 2015; UN Secretary-General, 2003). In the United States, a minor is considered to have experienced sex trafficking if they engage in or experience any minor sex exchange (MSE), meaning they sell, trade, or exchange sex in a commercial sex act, regardless of the involvement of a third-party trafficker or any presence of force, fraud, or coercion (Kotrla, 2010; Miller-Perrin & Wurtele, 2017; Trafficking Victims Protection Act, 2017; Victims of Trafficking and Violence Protection Act, 2000).

Though previously classified as juvenile prostitution and considered a criminal offence committed by the minor, adolescent MSE is now viewed under federal law as victimization, rather than criminal perpetration, in recognition that people of younger ages—particularly non-adults—are inherently more vulnerable to sexual exploitation (Miller-Perrin & Wurtele, 2017). In the United States, no credible estimates exist for the prevalence of MSE, though research has shown that it is not isolated to a particular gender, demographic group, or region (Franchino-Olsen, Chesworth, et al., 2020). Many researchers have investigated the risk factors, vulnerabilities, or correlates that may lead to or be associated with MSE events (Choi, 2015; Franchino-Olsen, 2019). Empirical findings suggest experiences of compromised parenting or caregiver strain (Cole & Sprang, 2015; Reid, 2011; Reid et al., 2017; Reid & Piquero, 2014,

2016), poverty (Cole & Sprang, 2015), juvenile delinquency (Chohaney, 2016; Kaestle, 2012), running away (Cobbina & Oselin, 2011; Kaestle, 2012; Martin et al., 2010; O'Brien, White, et al., 2017; Reid & Piquero, 2016; Roe-Sepowitz, 2012), or conflicts with parents or caregivers are some of the risk factors or correlates that lead to or are associated with MSE (Chohaney, 2016). However, it should be noted that a seemingly disproportionate piece of this risk factor research has focused on or centered around MSE experiences of individuals assigned female at birth or cisgender girls (Kenny et al., 2020; McNeal, 2020; O'Brien, Li, et al., 2017; Reid, 2011; Rivers & Saewyc, 2012; Robert & Willis, 2013). Additionally, experiencing violence during childhood, especially sexual violence, appears to increase the risk of MSE in adolescence (Edwards et al., 2006).

Disability and violence victimization

Disability as a risk factor for MSE has not been extensively investigated, though numerous studies have found that individuals with disabilities are also at increased risk of experiencing other forms of violence and maltreatment, including sexual violence (Haydon et al., 2011; Jones et al., 2012; Kahn et al., 2019). As with MSE, there are assumptions that individuals with a disability who are assigned female at birth are more likely to be vulnerable to sexual abuse or violence than those assigned male at birth; however, there is some evidence that males and females with developmental disabilities have similar levels of victimization risk (Platt et al., 2015). Exploring the relationships between disability and forms of violence or maltreatment victimization in the assigned-male-at-birth population is important to understanding the unique violence and abuse experiences that may be experienced by males. Given evidence suggesting that males may be more likely to have a disability, compared to individuals assigned female at birth, this group may constitute a great deal of the population of minors with disabilities. While

diagnostic criteria bias towards males could contribute to an under-identification of females with disabilities (Duvekot et al., 2017; Share & Silva, 2003; Shaywitz et al., 1990), one reason for the higher rates of disability among males, particularly for developmental disabilities, is that many conditions resulting in intellectual disability correspond with X-chromosome gene mutations (Lubs et al., 2012). Since individuals assigned male at birth are assumed to have only one X chromosome (though this is not the case for all people whose sex assigned at birth is male), they are especially vulnerable to these underlying genetic deficiencies compared to females. (Estimates indicate that 5-10% of intellectual disabilities among males are caused by X-linked conditions (Lubs et al., 2012). Thus, it is valuable to examine the links between disability and violence victimization for individuals assigned male at birth rather than assuming that similar patterns of victimization exist for females and males with a disability.

To that point, some research has investigated male-specific associations between disability and violence. An analysis of data from The National Longitudinal Study of Adolescent to Adult Health (Add Health) examined the relationship between physically forced and non-physically coerced sex among young adults (ages 26–32) with a disability (Haydon et al., 2011). Results indicated that males with physical disabilities had significantly greater odds (1.9; 95% CI: 1.02-3.52) of coerced sex than males without disabilities. Childhood sexual abuse was also significantly related to reporting experiences of both coerced and forced sex among males (Haydon et al., 2011). Other studies by Mitra and colleagues (2011, 2013, 2016) also support the notion that males with disabilities are more likely than males without disabilities to be victims of dating and sexual violence, including attempted and completed rape.

Links between MSE and disability

While the relationship between disability and MSE experiences is less established than the links between disability and other forms of sexual violence or between commonly studied risk factors (e.g., running away) and MSE, there are a handful of studies that have investigated the associations between disability and minors' involvement in commercial sex exchange. However, much of this existing literature considering disability and MSE has focused on the experiences of girls or those assigned female at birth. For example, after reviewing case records from Florida, Reid (2018) found that 15 of 54 (28%) cases of girls who had experienced minor sex trafficking had an intellectual disability. This estimate was much higher than the national prevalence of intellectual disability which lies somewhere around 1–3% (Reid, 2018). Another study examining disability as a risk factor of domestic minor sex trafficking among adolescent girls in the United States using Add Health data found that those with severe physical disabilities and those with low cognitive abilities were 5.83 and 4.86 times, respectively, as likely to experience minor sex trafficking (Franchino-Olsen, Silverstein, et al., 2020). Qualitative findings from practitioners who work with minor trafficking survivors noted a case in Connecticut where young boys with disabilities were compelled to engage in MSE by third-party traffickers, highlighting the intersections of disability with other MSE risk factors, including survival needs, to create vulnerability for exploitation (Valdovinos et al., 2020). Other human trafficking experts and practitioners focused on adolescents also recognize this understudied link between disability and MSE, as evidenced by a series of targeted education and outreach materials focused on human trafficking of youth with disabilities put together by the International Organization for Adolescents (International Organization for Adolescents, 2020). Although such research and resources advance our understanding of links between disability and MSE, there is still a glaring

gap in the empirical literature examining this potential relationship among individuals with disabilities who were assigned male at birth.

Current study

This study examined the associations between physical and cognitive disability status and MSE experiences, with MSE capturing the exchange of sex for money or drugs, for adolescents in the United States who were assigned male at birth. Intersectionality provides a useful framework for approaching this potential connection between disability, sex assigned at birth and/or gender, and MSE, as it highlights how co-existing vulnerabilities of disability and assigned sex and/or gender can interact or compound to create an overall vulnerability for sexual abuse or exploitation. Violence against individuals with disabilities can be understood to arise via socially created vulnerability—a result of individual and contextual factors—which disempowers those at risk (Shakespeare, 2014). Many of the frameworks used to understand the vulnerabilities of MSE or minor sexual exploitation are grounded in the idea that these vulnerabilities result in marginalization and disempowerment, often isolating individuals or groups from resources, basic needs, or economic or social power, which allows sexual abuse and commercial exploitation to occur (Franchino-Olsen, 2021). Disability can be viewed as a marginalized identity in recognition of the discrimination, oppression, and social exclusion experienced by those in this group (Geiger, 2019). Likewise, cisgender girls are often assumed to be most at risk of sexual abuse in the form of MSE, so protections, resources, and identification tools may marginalize other sexes and genders in centering girls in the MSE prevention and response work (Fitzgerald et al., 2021; Gozdzia, 2020). Within the framework of intersectionality, disability and assigned sex and/or gender can be viewed as interacting

marginalized identities which create unique vulnerability for MSE, and it is within that framework that this study positions its research questions.

While there is evidence showing that minors who experience other forms of sexual violence may be more likely to experience MSE and that minors and adults with disability have a heightened risk of sexual violence, regardless of gender or sex assigned at birth, there is no evidence exploring the associations between disability and MSE for male adolescents in the United States, despite males being more vulnerable to certain types of disabilities (Haydon et al., 2011; Jones et al., 2012; Kaestle, 2012; Kahn et al., 2019; Reid, 2014). This evidence gap may result in the emphasis of much of the MSE/minor sex trafficking prevention and messaging being targeted at or centered around girls or females, given certain assumptions that they experience a greater burden of MSE/minor sex trafficking. However, until these relationships are explored for males or boys, as well as for other genders, anti-human trafficking efforts should not assume that males with disabilities are not experiencing victimization and exploitation via MSE.

This study utilized Add Health data, which provided a large, population-based sample (originally nationally representative of school-enrolled adolescents in the United States) to examine the relationships between disability and MSE for males. The Add Health sample likely includes individuals with an MSE history who are potentially overlooked in studies focused on minors considered at high risk for MSE (e.g., studies drawing samples from homeless or runaway minors), and previous publications have used Add Health data to examine MSE (Edwards et al., 2006; Franchino-Olsen et al., 2021; Kaestle, 2012; Ulloa et al., 2016). Given the focus of the current study, Add Health is especially valuable as a relatively large proportion of males in the sample indicated they had experienced MSE (exchanged sex for money or drugs; Edwards et al., 2006; Franchino-Olsen et al., 2021; Kaestle, 2012; Ulloa et al., 2016). This large

proportion of males in the Add Health sample with a history of MSE (4.83% of the male sample, as shown in Franchino-Olsen et al. (2021); or, 3.5% of the total sample, 67.9% of which were males, as shown in Edwards et al. (2006) is approximately similar to that detected in a recent analysis by Gerassi and colleagues (2021) of a sample of in-school, U.S. adolescents (2.47% of the sample reported trading sex, with approximately equal numbers of cisgender, heterosexual girls and boys reporting sex exchange). This lends confidence to the assertion that males in the Add Health sample are those with a history of MSE who may have otherwise been overlooked or assumed to be at negligible risk for MSE given their sex and school enrollment status.

Therefore, to extend previous research and fill the gap surrounding the links between disability and MSE for males, we sought to investigate the following research questions:

- 1) Are MSE experiences associated with the severity of a minor's physical disability for male adolescents in the United States?

Hypothesis 1: Compared to male minors without a physical disability, male minors with a physical disability will show increased odds of MSE, and the strength of these associations will vary by disability severity.

- 2) Are MSE experiences associated with a minor's cognitive ability for male adolescents in the United States?

Hypothesis 2: Compared to male minors with average cognitive ability, male minors with below average cognitive ability scores will show increased odds of MSE, and the strength of these associations will vary by cognitive ability score level.

Methods

Sample

This study analyzed Add Health data, which sampled a large, nationally-representative, longitudinal cohort study of more than 20,000 students in the United States who were in 7th–12th grade (approximately aged 12–18) in 1994–1995 (Harris, 2013). Add Health participants provided written informed consent for all aspects of Add Health in accordance with the University of North Carolina School of Public Health Institutional Review Board guidelines.

This paper analyzes data from the first two periods of data collection, comprising the Wave I and II in-home interviews with the adolescents and interviews with their parents. Wave I included the original 20,745 respondents (of whom 10,263 were male) aged 12–20 in 1994–1995, and Wave II included 14,738 respondents (of whom 7,182 were male) of the original respondents who were aged 12–22 in 1996 (Harris, 2013). More information about the study design and sampling methods can be found in earlier publications (Harris, 2013).

Study inclusion criteria included: the adolescent being male (sex assigned at birth was male); being aged 18 years or younger at Wave II to ensure better consistency with the legal definition of sex trafficking of minors for this measure of MSE; and having valid sampling weights and complete data on all primary variables of interest for this study (i.e., MSE, physical disability, cognitive ability, and sociodemographic characteristics). A total of 4,401 respondents were included in the analysis sample.

Measures

Minor sex exchange. Minor sex exchange (MSE; i.e., any commercial sex exchanged before age 18) was assessed at Waves I and II by asking the adolescent whether he had “given someone sex in exchange for money or drugs” (*Add Health Codebook Explorer (ACE)*, n.d.). At Wave I, respondents were asked about lifetime experiences, while Wave II only asked about the

time period between the Wave I and Wave II interviews. Those who responded “yes” to either of these questions were classified as having experienced MSE.

Physical disability. Physical disability was assessed via the Physical Disability Index (PDI; Cheng & Udry, 2002) a measure successfully used in previous research studies (Haydon et al., 2011; Kahn et al., 2019). PDI information was collected during in-home interviews in Wave I using both adolescent and parent responses to a series of questions on limb difficulties; medical equipment usage; assistive care needs; perceptions and beliefs related to the adolescent’s disability status; difficulties with walking, standing, extending, grasping, or holding items; blindness; and deafness. Responses from the adolescents and parents were coded independently to calculate a PDI score for each respondent, with PDI scores ranging from 0 to 3, with 0 indicating no physical disability, 1 indicating mild physical disability, 2 indicating moderate physical disability, and 3 indicating severe physical disability. Additional information on the construction of the PDI is available elsewhere (Cheng & Udry, 2002).

Cognitive ability. Cognitive ability was assessed using the 87-item Add Health Picture Vocabulary Test (AHPVT) administered at Wave I (Carolina Population Center, 1998). The AHPVT is an abridged version of the Peabody Picture Vocabulary Test, and is moderately correlated with other measures of intelligence, including the Stanford-Binet Intelligence Scale and the Wechsler Intelligence Scale for Children ($r=0.4-0.6$; $\alpha=0.61-0.88$) (Becker, 2003; Beres et al., 2000; Carolina Population Center, 1998; Dunn & Dunn, 1981; Wechsler, 2004). AHPVT scores were standardized to mimic an intelligence quotient (IQ) metric, with a mean of 100 and a standard deviation of 15 (Carolina Population Center, 1998). AHPVT scores are categorized as low (score of <85), low-middle (85–99), high-middle (100–114), and high (>114) (Kahn & Halpern, 2018).

Sociodemographic characteristics. Sex assigned at birth (recorded by Add Health researchers as biological sex) of respondents was identified from school records and confirmed by the interviewer at Wave I; only those assigned male at birth (referred to as “males” moving forward) were included in this analysis. Each respondent’s age at Wave I was calculated by subtracting the respondent’s birth date from the interview date. Self-reported race and ethnicity were collected at Wave I and categorized as Hispanic, non-Hispanic (NH) White, NH Black, NH Asian, and NH other race. Parental education was used as a proxy measure for socioeconomic status and reflected highest education attained by either parent at Wave I (Kahn & Halpern, 2018).

Analysis

Descriptive analyses were used to examine measures of interest. The percentage who experienced MSE was computed for each physical disability category, and unadjusted odds ratios (ORs) and associated 95% confidence intervals (CIs) were used to examine the odds of experiencing MSE among those with severe physical disabilities, moderate physical disabilities, and mild physical disabilities, relative to males with no physical disabilities (the reference group). The same procedure was used to examine the odds of experiencing MSE among those with low cognitive ability, low-middle cognitive ability, and high cognitive ability scores, relative to males with high-middle cognitive ability scores (the reference group). Next, an adjusted logistic regression model was fit to examine potential associations between physical disability and cognitive ability with MSE. This model estimated the adjusted odds (aOR) of experiencing MSE as a function of both physical disability and cognitive ability, while controlling for the sociodemographic variables. Analyses used a complete-case sample of males who had non-missing values for all primary variables of interest, and individuals excluded due to

missing data accounted for less than 10% of male respondents in the Add Health sample (91.4% of male respondents included in these analyses). All analyses accounted for Add Health's complex survey design—including weighting, stratification, and clustering—in the application of sampling weights and adjustment of variance estimates (Harris, 2013). Analyses were completed using Stata 16.1 (StataCorp, 2020) and were approved by the Institutional Review Board at the University of North Carolina at Chapel Hill.

Results

Description of the Sample

Table 1 presents information on the characteristics of the sample. The average age at the Wave II interview was 15.78 years, with 41.82% being 15-16 years of age, 35.09% being 17-18 years of age, and 23.09% being 13-14 years of age. The majority of the sample identified as NH White (68.47%), followed by NH Black (13.44%), Hispanic (10.97%), NH Asian (3.48%), and NH other (3.63%). More than 60% of the sample had at least one parent who had completed some college or who was a college graduate. Approximately 6% of the sample had a physical disability. Regarding cognitive ability, 10.33% of the sample were in the lowest scoring category (AHPVT score of <85), 31.09% were in the low-middle category (85–99), 37.53% were in the high-middle category (100–114), and 20.55% were in the high category (>114). Finally, approximately 4% of the sample reported experiencing MSE during their lifetime. Prevalence of MSE was higher when measured at Wave II, meaning a greater proportion of the respondents reported MSE events that occurred during the time period between Waves I and II compared to before Wave I (3.06% vs. 1.54%).

MSE by Physical Disability and Cognitive Ability

Table 2 presents information on the adolescents' experiences of MSE by their physical disability and cognitive ability statuses. A greater percentage of males with severe physical disabilities experienced MSE (14.87%) compared to those with moderate physical disabilities (1.58%), mild physical disabilities (6.54%), or no physical disabilities (4.14%). Moreover, males with severe physical disabilities were significantly more likely to experience MSE compared to those without physical disabilities, with males with severe physical disabilities having 4.04 times the odds of experiencing MSE compared to those without physical disabilities (95% CI: 1.32, 12.38). The percentages of males with moderate or mild disabilities experiencing MSE did not differ significantly from the percentage without physical disabilities (moderate physical disabilities OR: 0.37, 95% CI: 0.05, 2.56; mild physical disabilities OR: 1.62, 95% CI: 0.74, 3.53).

Table 2 also shows that 9.57% of males with low cognitive abilities (AHPVT scores <85) experienced MSE, compared to 5.55% of those with low-middle (85–99), 3.64% those with high-middle (100–114), and 0.96% of those with high cognitive abilities (>114). Compared to those with high-middle cognitive ability scores, males with low cognitive ability scores were significantly more likely, and males with high cognitive ability scores were significantly less likely to experience MSE. Specifically, males with low cognitive ability scores had 2.80 times the odds (95% CI: 1.60, 4.92) and males with high cognitive ability scores had 0.26 times the odds (95% CI: 0.11, 0.63) of experiencing MSE compared to males in the high-middle score category. No other significant differences emerged between cognitive ability score groups in these bivariate comparisons.

Table 3 presents results of the multivariate logistic regression model, examining MSE experiences as a function of both physical disability and cognitive ability while controlling for

sociodemographic variables. Males with severe physical disabilities were significantly more likely to experience MSE compared to those with no physical disabilities, (aOR: 3.47; 95% CI: 1.11, 10.89). Males with low cognitive ability scores were significantly more likely to experience MSE than those with high-middle cognitive ability scores (aOR: 2.84, 95% CI: 1.40, 5.78). In addition, males with high cognitive ability scores were significantly less likely to experience MSE compared to those with high-middle cognitive ability scores (aOR: 0.28, 95% CI: 0.11, 0.67). No other statistically significant differences emerged for the other physical disability or cognitive ability score groups compared to their respective reference groups.

Discussion

Using a population-based sample, these analyses provide the first evidence that severe physical disability and low cognitive ability are associated with MSE for male adolescents in the United States. These results add to the evidence that pushes back on the assumption that most individuals experiencing MSE maltreatment and exploitation are girls and highlight the potential intersectional nature of vulnerability for MSE that exists for those who are male and disabled (Gerassi et al., 2021; McNeal, 2020; Rivers & Saewyc, 2012; Robert & Willis, 2013). Our findings build on previous examinations of the links between vulnerabilities created by disability and sexual violence and spotlight the need for targeted prevention and intervention strategies for males with disabilities who seem to be at heightened risk for MSE relative to their peers.

Our first hypothesis was that adolescent males with physical disabilities would be more likely to report experiencing MSE compared to males without disabilities, with the strength of these associations varying by disability severity. This hypothesis was partially supported. Specifically, we found that males with severe physical disabilities were more than three times as likely to have experienced MSE compared to those without disabilities. However, such

differences did not emerge for the other physical disability severity groups (mild; moderate). These results mirror those found in a similar sample of female respondents and may similarly suggest that having more observable physical limitations may make one more vulnerable to MSE exploitation by third-party traffickers and/or those buying sex (Franchino-Olsen, Silverstein, et al., 2020).

We similarly hypothesized that males with lower cognitive ability scores would be more likely to report experiencing MSE compared to those of average cognitive ability, with the strength of the associations varying by cognitive ability score level. This hypothesis was supported. Males in the lowest cognitive ability score category were more than twice as likely as males with high-middle cognitive ability scores to have experienced MSE, which is similar to the patterns found among females (Franchino-Olsen, Silverstein, et al., 2020). Furthermore, we found that males in the highest cognitive ability category had approximately one-fourth the odds of experiencing MSE compared to those in the reference group. The contrasting relationships among the highest and lowest cognitive ability groups provide some evidence that strengths in associations vary across ability categories, with the strongest being among those in the highest and lowest score categories.

Sociodemographic characteristics were adjusted for in the multivariate regression to account for adolescents' age, race and/or ethnicity, and socioeconomic status (measured via highest parental education) in the relationship between disability and MSE. Of the demographic variables included in the multivariate regression, age and race/ethnicity did not significantly impact odds of MSE for this sample. However, those with at least one parent in the highest education category (college graduate) were significantly less likely to experience MSE. As parental education is a proxy for socioeconomic status in the Add Health data, this suggests an

association between household income and MSE that is consistent with previous literature, which proposes that poverty is a risk factor for MSE as it creates instability and vulnerability via unmet needs and a stressful environment (Gerassi et al., 2021; Laird et al., 2020). As poverty has also been linked to disability, it was crucial to include this proxy measure for income to account for potential confounding (Palmer, 2011).

Findings from these analyses add to existing evidence demonstrating that disability may be a risk factor for MSE and the potential intersectionality that exists between disability and assigned sex and/or gender for sexual exploitation via MSE. Children with disabilities experience a higher rate of sexual abuse than their non-disabled peers and many of these disabled children may not feel they have the control or power to speak about or stop the abuse (Palusci et al., 2016). Thus, it is crucial to consider how disability intersects with other identities or circumstances that create potential vulnerability—including assigned sex and/or gender—for MSE, and these findings add to that intersectional evidence by considering males who are often overlooked or assumed to be less at risk of MSE than females, particularly cisgender girls (Fitzgerald et al., 2021; Gozdzia, 2020; Rivers & Saewyc, 2012).

There may be concerns about the age of the Add Health sample used for these analyses, as it was collected from participants in the mid-1990s; however, the risk factor and MSE prevalence findings demonstrated here and in other Add Health publications are in many ways similar to another population-based analysis which sampled adolescents in 2018 (Franchino-Olsen et al., 2021; Gerassi et al., 2021; Kaestle, 2012). Comparable to the approximately 4% of the male Add Health sample in this analysis who experienced MSE, Gerassi and colleagues (2021) analyzed a 2018 sample of school-enrolled adolescents and found that approximately 2–3% of their complete sample engaged in commercial sex trade. Results from Gerassi and

colleagues (2021) also indicated that there were no significant differences between cisgender, heterosexual males and their cisgender, heterosexual female peers in their prevalence of reporting sex trading. This seems to suggest that the Add Health estimates presented here may continue to apply to and highlight relevant risk and prevalence patterns for today's adolescents as they did for the adolescent population when originally collected. Given the absence of other studies examining this disability-MSE relationship, these results seem a valuable addition to the field and lay the groundwork for future research using a more recent sample.

The implications of these findings highlight the potential drivers of vulnerabilities for males with disabilities who experience MSE and system-level gaps that may be exacerbating MSE risk in this population. There are many individual-level factors, beyond the impairment alone, that could help explain the association between disability and MSE. Dependency on caregivers, possible communication difficulties, lack of self-advocacy skills, and low levels of knowledge or understanding regarding sexual health and relationships are reasons that have been given to explain why people with disabilities may be predisposed to experience violence (Davis, 2019; Nosek et al., 2001). However, rather than putting the responsibility on the individual with a disability, the association between disability and exploitation via MSE illuminates the larger societal and systemic issues that lead to health disparities in this population (Krahn et al., 2015). There are a variety of points along a system's continuum that could contribute to increased risk of MSE among people with disabilities. System-wide weaknesses that may indirectly contribute to the higher MSE risk include under-identification of disability, insufficient sex education, inadequate knowledge of sexual exploitation among professionals working with children with disabilities, and poor disability support for violence victims/survivors (Franklin & Smeaton, 2017). Considering these potential system inadequacies, services targeting a child's disability, at

a minimum, are likely ill equipped to prevent MSE or identify and care for children at risk of sexual exploitation. Furthermore, agencies and providers working with children who have been sexually exploited, such as those in the criminal justice system, may not be well integrated into education and disability-related social services, which address more mainstream needs of children with disabilities. Therefore, children with disabilities who have experienced MSE may experience the consequence of insufficiencies emanating from intersecting systems.

Strengths and limitations

A major strength of this study is our use of a population-based dataset of adolescents. The inclusion of questions about disability and exploitation via MSE, respectively, make this dataset highly valuable, especially considering that there still is a lack of population-based research on disability and minor sex exchange/sex trafficking more broadly. Furthermore, Add Health oversampled respondents reporting a physical disability and used recruitment and survey methodologies that follow best practices for surveying populations with disabilities, such as including schools, using in-home surveys, and computer technology in interviews (Kahn et al., 2019). The PDI results for adolescent males reflect these strengths in the survey and dataset design. The focus on male adolescents in this study is valuable, as it provides space and attention on males who experience MSE and who are often looked over or assumed to be a minority of the population at risk of MSE. Thus, the large male sample responding to questions about MSE as available in Add Health provides a unique opportunity to examine the links between disability and MSE for males.

Characteristics of the Add Health sample limit this study. The data used for these analyses were collected from 1994–1996, which raises whether the associations between MSE and disability have substantially shifted since that time. Reassuringly, results that were

approximately similar in prevalence and risk factor associations were found in analyses by Gerassi and colleagues (2021) using a more recent sample comparable to Add Health (Edwards et al., 2006; Franchino-Olsen et al., 2021). While we were able to detect significant associations between disability and MSE, reports of MSE events in Add Health are likely underreported and under-represented. The topic of exchanging and trading sex, especially among those who have recently experienced the event and/or are at high-risk to re-experience the exploitation, can be sensitive. As such, respondents may have been hesitant to report their experiences, especially if they were engaged in active exploitation or feared for their safety. In addition, the relevant Add Health survey items only ask about sex exchanged for money or drugs and, thus, are too narrow to reflect all forms of commercial sex exchange via MSE, especially all forms which qualify as minor sex trafficking. Parental education had to be used as a proxy for household income. Though this is consistent with previous Add Health studies, it likely limited the precision of the measure meant to control for poverty as a confounding variable (Kahn & Halpern, 2018). Furthermore, Add Health is a school-based sample, which means that those who are disconnected from the school systems—thus, many who are more likely have experienced or are currently experiencing MSE (Wolfe et al., 2018)—would not have been included in this analysis; though, like the work of Gerassi and colleagues (2021), this sample does capture adolescents who may be overlooked when examining populations at high risk for MSE (Udry & Chantala, 2003). Finally, though it is unlikely that missing data biased results in this complete-case analysis, this sample is limited by the exclusion of participants (<10% of the sample) with item non-response on our variables of interest.

Conclusion

This study provides evidence that physical disability and low cognitive ability may be risk factors for exploitation via minor sex exchange among adolescent males. Findings presented in this paper reflect those from broader research exploring disabilities as risk factors for MSE/minor sex trafficking among both males and females, as well as sexual violence generally. The relationship patterns for MSE among adolescent males were similar to the patterns seen among females, likely indicating that there are greater societal and system-wide gaps in meeting the needs of children with disabilities contributing to their increased vulnerability to violence and sexual exploitation. As such, research, practice, service provision, and policy related to minor sex trafficking should give adolescent with disabilities special consideration.

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Table 1. Characteristics of the study sample (n=4,401)

	n (%)
Age	
13–14 years	769 (23.09)
15–16 years	1752 (41.82)
17–18 years	1880 (35.09)
Race & Ethnicity	
Hispanic	683 (10.97)
White, Non-Hispanic	2450 (68.47)
Black, Non-Hispanic	844 (13.44)
Asian, Non-Hispanic	288 (3.48)
Other, Non-Hispanic	136 (3.63)
Highest Parental Education	
Less than High School	466 (10.50)
High School Graduate/GED	1032 (25.26)
Some College	1340 (32.18)
College Graduate	1563 (32.06)
Physical Disability (Physical Disability Index)	
Severe	45 (1.17)
Moderate	48 (1.05)
Mild	157 (3.47)
None	4151 (94.31)
Cognitive Ability (AHPVT)	
Low (<85)	563 (10.33)
Low-Middle (85–99)	1360 (31.09)
High-Middle (100–114)	1603 (37.53)
High (>114)	875 (20.55)
Experienced Minor Sex Exchange	
Ever in lifetime	190 (4.32)
Prior to the Wave I Interview	60 (1.54)
Between the Wave I and Wave II Interviews	139 (3.06)

Notes: Percentages are weighted to yield nationally representative estimates; NH = Non-Hispanic; GED = General Educational Development; AHPVT = Add Health Picture Vocabulary Test; Race was defined as described in Udry, Li, and Hendrickson-Smith (2003)

Table 2. Minor sex exchange experiences by physical disability and cognitive ability status

	Experienced Minor Sex Exchange (%)	Odds Ratio (95% CI)
Physical Disability (PDI)		

<i>Severe</i>	14.87	4.04 (1.32, 12.38)*
<i>Moderate</i>	1.58	0.37 (0.05, 2.56)
<i>Mild</i>	6.54	1.62 (0.74, 3.53)
<i>None</i>	4.14	Reference group
Cognitive Ability (AHPVT)		
<i>Low (<85)</i>	9.57	2.80 (1.60, 4.92)*
<i>Low-Middle (85–99)</i>	5.55	1.56 (0.97, 2.49)
<i>High-Middle (100–114)</i>	3.64	Reference group
<i>High (>114)</i>	0.96	0.26 (0.11, 0.63)*

Notes: CI = confidence interval; PDI = Physical Disability Index; AHPVT = Add Health Picture Vocabulary Test; * = Statistically significant at $p < 0.05$.

Table 3. Multivariate logistic regression model results of adolescent males experiencing minor sex exchange by physical disability and cognitive ability status

	aOR (95% CI)
Physical Disability (PDI)	
<i>Severe</i>	3.47 (1.11, 10.89)*
<i>Moderate</i>	0.28 (0.04, 1.94)
<i>Mild</i>	1.69 (0.76, 3.77)
<i>None</i>	Reference group
Cognitive Ability (AHPVT)	
<i>Low (<85)</i>	2.84 (1.40, 5.78)*
<i>Low-Middle(85–99)</i>	1.37 (0.86, 2.18)
<i>High-Middle (100–114)</i>	Reference group
<i>High (>114)</i>	0.28 (0.11, 0.67)*
Age at Wave II	1.16 (0.99, 1.37)
Race/Ethnicity	
<i>Hispanic</i>	0.44 (0.14, 1.34)
<i>NH White</i>	Reference group
<i>NH Black</i>	0.99 (0.51, 1.94)
<i>NH Asian</i>	0.58 (0.15, 2.23)
<i>NH Other Race</i>	0.74 (0.22, 2.51)
Parental Education	
<i><HS</i>	Reference group
<i>HS Graduate/GED</i>	1.01 (0.41, 1.98)
<i>Some College</i>	0.86 (0.44, 1.70)
<i>College Graduate</i>	0.46 (0.22, 0.96)*

aOR = adjusted odds ratio; CI = confidence interval; PDI = Physical Disability Index;

AHPVT = Add Health Picture Vocabulary Test; NH = Non-Hispanic;

HS = high school; GED = General Educational Development;

*=statistically significant at $p < 0.05$