J Autism Dev Disord (2017) 47:2275–2281
DOI 10.1007/s10803-017-3111-7

BRIEF REPORT

Brief Report: Examining the Association of Autism and Adverse Childhood Experiences in the National Survey of Children's Health: The Important Role of Income and Co-occurring Mental Health Conditions

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Published online: 4 April 2017

Abstract Adverse childhood experiences (ACEs) are risk factors for mental and physical illness and more likely to occur for children with autism spectrum disorder (ASD). The present study aimed to clarify the contribution of poverty, intellectual disability and mental health conditions to this disparity. Data on child and family characteristics, mental health conditions and ACEs were analyzed in 67,067 youth from the 2011–2012 National Survey of Children's Health. In an income-stratified sample, the association of ASD and ACEs was greater for lower income children and significantly diminished after controlling for child mental health conditions, but not intellectual disability. Findings suggest that the association of ACEs and ASD is moderated by family income and contingent on co-occurring mental health conditions.

Keywords Autism spectrum disorder · Adverse childhood experiences · Comorbidity · Anxiety · Depression · Attention problems · Behavioral problems

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Introduction

Research suggests that individuals with autism spectrum disorder (ASD) experience a greater number of adverse childhood experiences (ACEs; Felitti et al. 1998) that may compromise their chances for optimal physical and mental health outcomes (Berg et al. 2016; Rigles 2016). Using data from the 2011–2012 National Survey of Children's Health (NSCH), Berg et al. (2016) found that a caregiver-reported ASD diagnosis was associated with higher probability of experiencing 1–3 and ≥4 ACEs in US children, after controlling for poverty and residential disadvantage. Building upon these findings, Rigles (2016) found ACEs to be negatively associated with health and mental health, but not resiliency (a protective factor that can be eroded by ACEs; Tiet et al. 1998), in children with ASD in the NSCH.

The findings of Berg et al. (2016) and Rigles (2016) provide compelling and novel evidence of disparities in both ACEs and mental health outcomes in children with and without ASD. However, they do not fully illustrate how the varied clinical profiles of children with ASD may moderate or contribute to these relationships. The vast majority of youth with ASD present with co-occurring disorders, such as intellectual disability, anxiety, depression, attention and behavior problems (Developmental Disabilities Monitoring Network 2014; Simonoff et al. 2008). Considering this complex profile is critical to assessing if symptoms of ASD are independently related to ACEs as opposed to other aspects a child's clinical presentation. Such analyses may elucidate which children with ASD are particularly likely to experience childhood adversity, an important question for understanding what may potentially drive the relationship of ACEs and ASD and identifying children who are most at risk.

Moreover, data from the NSCH suggest that children from families at or below the federal poverty line are more likely to experience ACEs than those above it (Child and Adolescent Mental Health Initiative 2013). Though Berg et al. (2016) and Rigles (2016) included poverty as a covariate in their regression models, this approach may obscure a differential relationship between ACEs and ASD by poverty level (e.g., a vulnerability to ACEs in children with ASD and financial insecurity), a pattern discernable by stratification.

The present study aimed to elucidate the potential role of poverty and child clinical characteristics on the increased adversity reported for children with ASD from the NSCH in recent studies. Such analyses have important implications for how we understand the relationship of ACEs and ASD. They will also help identify which children with ASD are most likely to experience adversity and inform our hypotheses as to why.

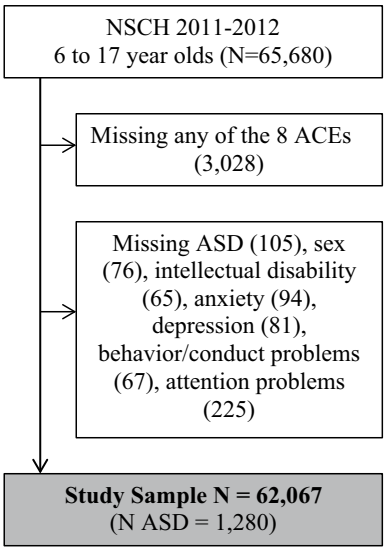

Fig. 1 Selection of final sample N = 62,067 (n ASD = 1280)

Methods

Data were drawn from the 2011–2012 NSCH, a nationally representative telephone survey of households with children 0–17 years in the United States conducted by the National Center for Health Statistics (Blumberg et al. 2005; 2012). Respondents were 95,677 parents/guardians of children from families selected by random digit dialing. A sampling weight provided by the National Center for Health Statistics was applied to each child's data record to ensure estimates were representative of the non-institutionalized child population.

In addition to basic demographic information, the survey included questions about child emotional, behavioral and developmental issues as well as inquiries into 8 ACEs from a modified CDC-Kaiser ACE scale (National Center for Health Statistics 2011/12). Primary outcomes were having ≥2 ACEs and ≥4 ACEs. These outcomes were selected given that a quarter of the NCHS sample experienced ≥2 ACEs and research suggesting that ≥4 ACEs reflect a clinically meaningful threshold (Berg et al. 2016). We chose to consider ACEs that occur for children of all races and ethnicities. As such, a ninth ACE item regarding racial discrimination was excluded from ACE totals (ACE range 0–8). Consistent with Berg et al. (2016) and Rigles (2016), the ACE item on perceived financial stress was included in ACE totals. Though correlated with income level (polychoric correlation of −0.58), financial stress was reported across all income groups (e.g. 18% in highest income group).

ASD status was determined using the strategy developed by Blumberg et al. (2013) to assess the prevalence of ASD in 6–17 year old U.S. children using NSCH data. Children classified as having ASD were those with a parent report of ever being told by a health care provider that the child had ASD, and a parent report that the child currently has ASD. Children classified as having an intellectual disability were those with a parent report of ever being told by a doctor that the child had intellectual disability, and a parent report that the child currently has an intellectual disability. Children were also classified based on parent report of "anxiety problems", "depression," attention problems (referred to as "attention deficit disorder/ attention deficit hyperactivity disorder" in the survey) and/or "behavior or conduct problems" in the child as determined by a health professional at any point in the child's life. Other covariates considered included sex and age of child, race (Hispanic, White non-Hispanic, Black non-Hispanic, and Other), family structure (two parent, biological or adopted; two parent, step family; single mother, no father present; other), and family income (less than 100% of the federal poverty level (FPL) based on State Children's Health Insurance Program income groups, 100–199% FPL, 200–399% FPL, and 400% or more FPL). We considered less than 200% FPL to be "lower income" and 200% FPL and above "higher income." In keeping with Rigles (2016) and Blumberg et al. (2013), persons with missing data and children below age 6 years were excluded from the analysis, resulting in a final sample of 62,067 (Fig. 1). Rates of missing data on ASD and co-occurring conditions (0.3 vs. 0.2%) as well as ACEs (2.4 vs. 1.7%) were low and not meaningfully different between lower and higher income groups, respectively.

Table 1 Parent-reported characteristics of the study sample from the National Survey of Children's Health 2011–2012, children 6–17 years of age

	Total N = 62,067	ASD N = 1280	No ASD N = 60,787
Male	32,056 (51.1)	1044 (82.8)	31,012 (50.5)
Age, years	11.5 (3.5)	11.5 (3.2)	11.5 (3.5)
Race/ethnicity			
White	41,639 (53.4)	942 (62.3)	40,697 (53.2)
Hispanic	7710 (22.1)	104 (17.7)	7606 (22.2)
Black	5784 (13.9)	94 (11.0)	5690 (13.9)
Other	6934 (10.7)	140 (9.0)	6794 (10.7)
Poverty level			
<100% FPL	8364 (20.2)	202 (13.0)	8162 (20.4)
100–199% FPL	10,632 (21.4)	268 (21.6)	10,364 (21.4)
200–399% FPL	19,345 (29.1)	403 (36.4)	18,942 (29.0)
≥ 400% FPL	23,725 (29.4)	407 (29.0)	23,319 (29.4)
Family structure			
Two parent	42,096 (61.5)	787 (56.9)	41,309 (61.6)
Two parent, step	5511 (11.5)	107 (12.1)	5404 (11.5)
Single mother	9777 (19.2)	284 (23.4)	9493 (19.1)
Other	4683 (7.8)	102 (7.6)	4581 (7.8)
Intellectual disability	807 (1.3)	277 (25.0)	530 (0.8)
Anxiety	4383 (6.2)	613 (40.5)	3770 (5.5)
Depression	2878 (4.6)	284 (20.9)	2594 (4.3)
ADD/ADHD	7384 (11.8)	669 (49.0)	6715 (11.1)
Behavioral problems	2596 (4.6)	434 (35.3)	2162 (4.0)

Mean (SD) are shown for continuous variables and are weighted. For categorical variables, N (%) are calculated based on unweighted frequencies and weighted percentages. Percentages do not necessarily sum to 100% due to rounding. *ASD* autism spectrum disorders, *FPL* federal poverty level; living in households with incomes above/below the federal poverty based on the State Children's Health Insurance Program income groups Intellectual disability: does the child currently have; anxiety, depression, ADD/ADHD, behavioral problems: has the child ever had

Results

In total, 1280 (1.98%) of the study sample had ASD. Children with versus without ASD were more likely to be male, White non-Hispanic, and have a family without two parents, and income ≥200% FPL (all $p < 0.05$, Table 1). Report of ≥2 ACEs was more common in children below (37.1%) versus above 200% FPL (17.2%; $p < 0.01$). Children with ASD had significantly higher rates of intellectual disability, anxiety, depression, attention and behavioral problems compared with non-ASD. The mean (SD) number of ACEs reported for children with versus without ASD was 1.3 (1.6) and 1.0 (1.4), $p < 0.01$. Children with ASD were more likely to report ≥2 ACEs (33.3 vs. 25.3%; $p < 0.01$), and ≥4 ACES (20.2 vs. 12.0% $p < 0.01$) compared to children without ASD. This was similar to the proportion of children with versus without intellectual disability reporting ≥2 ACEs (35.1 vs. 25.3%), but lower than for children with versus without anxiety (47.5 vs. 24.0%), depression (60.7 vs. 23.7%), ADHD (42.2 vs. 23.2%), or behavioral problems (61.0 vs. 23.2%).

The unadjusted relationship between ASD and ACEs was magnified in lower income (<200% FPL) families (Table 2). In these families, 57.1% of children with ASD compared to 36.8% of those without ASD were reported to have ≥2 ACEs ($p < 0.001$) while in the higher income families these proportions were 20.6 vs. 17.1% ($p > 0.05$), respectively. The discrepancy for ≥4 ACEs was even greater with the proportions reported for ASD versus non-ASD children being 20 vs. 12% ($p < 0.001$) in lower income families compared to 4.1 vs. 4.0% ($p > 0.05$) in higher income families. Among lower income families, children with versus without ASD were more likely to report financial stress, divorce/separation, neighborhood violence, mental illness in the home, and drugs in the home (all $p < 0.05$; Table 2). In higher income families, children

Table 2 ASD and report of ≥2 adverse childhood experiences (ACEs), stratified by poverty level, N (%)

	<200% federal poverty level			≥200% federal poverty level		
	No ASD N = 18,525	ASD N = 470	*p* value	No ASD N = 42,261	ASD N = 810	*p* value
Mean number of ACEs (SD)	1.5 (1.6)	2.2 (1.7)	<0.001	0.7 (1.2)	0.9 (1.3)	0.225
2 or more (%)	7210 (36.8)	255 (57.1)	<0.001	6086 (17.1)	170 (20.6)	0.318
4 or more (%)	2407 (12.0)	105 (20.2)	0.003	1488 (4.1)	51 (4.0)	0.926
Financial stress (%)	7955 (43.3)	276 (67.2)	<0.001	4,436 (12.4)	144 (24.4)	<0.001
Divorce/separation (%)	5782 (29.2)	181 (40.0)	0.009	7305 (21.0)	166 (22.8)	0.640
Death of parent (%)	1206 (5.7)	45 (8.0)	0.202	1106 (2.7)	26 (2.4)	0.750
Parent in prison (%)	2334 (12.6)	76 (17.9)	0.099	1468 (4.2)	38 (2.6)	0.075
Domestic violence (%)	2359 (12.7)	88 (17.7)	0.074	1965 (5.7)	48 (3.5)	0.046
Neighborhood violence (%)	2958 (16.2)	110 (22.1)	0.050	2861 (7.7)	74 (5.5)	0.144
Mental illness in home (%)	2716 (11.8)	120 (19.9)	0.001	3470 (8.2)	123 (15.7)	0.010
Drugs in home (%)	3351 (16.0)	109 (22.4)	0.037	4024 (10.2)	101 (8.4)	0.289

All percentages are weighted

Table 3 Odds ratios (OR) and 95% confidence intervals (CI) for the associations of ASD, co-occurring psychiatric symptoms, and report of ≥2 adverse childhood experiences (ACEs), stratified by federal poverty level (FPL)

	Model 1	Model 2 (Model 1 + intellectual disability)	Model 3 (Model 1 + anxiety)	Model 4 (Model 1 + depression)	Model 5 (Model 1 + ADD/ADHD)	Model 6 (Model 1 + behavioral problems)	Model 7 (Model 1 + intellectual disability, anxiety, depression, ADD/ADHD, behavioral problems)
<200% FPL (N = 19,011)							
ASD	1.92 (1.22, 3.02)	1.95 (1.27, 2.99)	1.27 (0.81, 1.99)	1.60 (1.02, 2.49)	1.59 (1.03, 2.55)	1.20 (0.77, 1.84)	1.14 (0.74, 1.77)
Intell dis		0.96 (0.61, 1.50)					0.71 (0.46, 1.10)
Anxiety			2.86 (2.25, 3.64)				1.50 (1.12, 2.02)
Depression				3.59 (2.75, 4.70)			2.19 (1.59, 3.02)
ADD/ADHD					1.83 (1.51, 2.21)		1.14 (0.92, 1.40)
Behav prob						3.37 (2.58, 4.41)	2.26 (1.68, 3.04)
≥200% FPL (N = 43,086)							
ASD	1.07 (0.59, 1.92)	1.04 (0.60, 1.80)	0.79 (0.44, 1.44)	0.84 (0.48, 1.46)	0.87 (0.50, 1.51)	0.72 (0.38, 1.37)	0.62 (0.37, 1.05)
Intell dis		1.12 (0.41, 3.07)					0.77 (0.30, 1.99)
Anxiety			2.48 (1.95, 3.14)				1.56 (1.20, 2.03)
Depression				2.91 (2.14, 3.95)			1.72 (1.22, 2.41)
ADD/ADHD					1.86 (1.49, 2.31)		1.43 (1.11, 1.85)
Behav prob						2.98 (2.04, 4.37)	1.81 (1.19, 2.75)

Model 1 is adjusted for poverty level, sex, age, race, family structure; a sensitivity analysis conducted with both income groups, found that removing persons who endorsed the financial hardship ACE did not meaningfully alter estimates. As such, estimates from the full sample (including those who endorsed the financial hardship ACE) are presented here

with versus without ASD reported higher rates of only perceived financial stress and parent mental illness. Domestic violence was endorsed more frequently for children without versus with ASD ($p < 0.05$) in the higher income group.

We next examined the associations of ASD and ACEs, adjusting for ID and mental health conditions in children from lower and higher income families separately. Separate logistic regression models that adjusted for sex, age, race, family structure, were used to examine associations of ASD with having ≥2 ACEs in lower and higher income families (Table 3).[1] Consistent with the unadjusted results, ASD was associated with higher risk (OR 1.92, 95% CI 1.22–3.02) of having ≥2 ACEs in lower income families, after adjustment for sex, age and family structure, though this was not found for higher income families (OR 1.07, 95% CI 0.59–1.92; Model 1). Additional adjustment for ID did not affect these associations (Model 2). However, in lower income families, additional adjustment for anxiety, depression, attention or behavioral problems resulted in attenuation of the ASD-ACE association (Models 3–6). In a full model, with adjustment for all co-occurring psychiatric symptoms (Model 7), ASD was no longer associated with increased risk of multiple ACEs in lower income families (OR 1.14, 95% CI 0.74–1.77). In higher income families, full model results suggest co-occurring mental health conditions were associated with increased odds of multiple ACEs, though ASD was not. Notably, a sensitivity analysis conducted with both low and high income samples, found that removing persons who endorsed the financial hardship ACE (which had a −0.58 polychoric correlation with income level) from our most adjusted model (Model 7) did not meaningfully alter estimates.

Discussion

Recent studies suggest that children with ASD experience disparities in early adversity that may compromise their physical and mental health outcomes (Berg et al. 2016; Rigles 2016). This study builds upon these findings by providing evidence that this relationship is likely moderated by family income and contingent on co-occurring mental health conditions in ASD. Findings suggest that children with ASD encounter more ACEs than children without ASD, and that this difference is especially pronounced in lower income families, a pattern unrecognized

[1] Results for analyses using ≥2 ACEs as the primary outcome are presented here for simplicity; however, these analyses were also conducted using ≥4 ACEs as the primary outcome and the pattern of results was the same.

in prior studies that controlled for, but did not stratify by family income (Berg et al. 2016; Rigles 2016). Overall, ≥2 ACEs were reported in a quarter of children without, but a third of those with ASD. In lower income families, almost two-thirds of children with ASD had ≥2 ACEs; a fifth had ≥4 ACEs. Reports of financial stress and mental illness were significantly more common in the families of youth with versus without ASD from both lower and higher income brackets. This is consistent with studies suggesting a particular financial burden associated with ASD that challenges both lower and higher income families (Kogan et al. 2008; Newschaffer et al. 2007). It is also consistent with the aggregation of psychiatric disorders in the relatives of those with ASD (Daniels et al. 2008). By contrast, other ACEs, including exposure to neighborhood violence, drug use and parent separation/divorce, were *only* more common for lower income youth with ASD.

Research indicates that children from lower versus higher income families experience more ACEs (Conroy et al. 2010). This study suggests that those with ASD may be particularly vulnerable. For families with limited financial resources, the additional financial, social and emotional challenges related to caring for a child with ASD may be particularly taxing and likely to result in family disruption or strain. The moderating effect of family income on parent separation rates seen in this study may also shed light on variable findings regarding the relationship status of parents of youth with ASD (Freedman et al. 2012; Hartley et al. 2010). Findings do not appear to reflect a tendency for families with lower income to report both more ACEs and more diagnoses: lower income families were more likely to report ACEs, but less likely to report ASD.

These findings also demonstrate an important, potentially clarifying connection between ACEs and the clinical characteristics of children with ASD. In this study, having ≥2 ACEs was associated with ASD status for lower income families; however, this relationship was no longer significant after adjusting for co-occurring mental health conditions. Children with anxiety, depression, attention and behavioral problems were, in general, twice as likely to have ≥2 ACEs, whether or not they also had ASD. By comparison, the relationship between ACEs and ASD was largely unchanged after adjusting for intellectual disability. These findings suggest that the presence of co-occurring mental health conditions may help clinicians (a) identify youth with ASD who are likely to experience or have experienced adversity and (b) intervene, when possible, to reduce stressors via greater monitoring (Marie-Mitchell and O'Connor 2013; Marie-Mitchell et al. 2016), medical home models (Kogan et al. 2008), enhanced parent support and focused efforts to help families access social and financial resources (Flynn et al. 2015).

A limitation of this cross-sectional study is the inability to assess causal relationships. In addition, single-reporter and item assessment of developmental and psychiatric symptoms is not ideal, but related to the challenges of collecting a nationally representative sample. The finding that mental health concerns are integrally related to adversity disparities in ASD, as they are in youth without ASD (Edwards et al. 2003), is nonetheless meaningful. Consistent with our findings, research utilizing diagnostic interviews suggests that the majority of youth with ASD meet criteria for one or more mental health conditions (Simonoff et al. 2008). These co-occurring conditions are associated with additional impairment and poorer health outcomes in ASD, making them important prevention and intervention targets (Ahmedani and Hock 2012; Van Steensel et al. 2012; Kerns et al. 2015a). In keeping with this thinking, our findings suggest that financial and emotional stressors associated with caring for a child with ASD may be as related to the mood and behavioral difficulties of that child as their ASD.

However, our findings may also support the possibility that childhood adversity contributes to the high rate of mental health issues experienced by individuals with ASD (Kerns et al. 2015b; Adams et al. 2014). Shared genetic/biological pathways likely contribute to psychiatric comorbidity in ASD (White et al. 2014), yet ACEs may also play an important role as known contributors to emotional dysregulation (a potential precipitant of psychiatric co-occurrence in ASD; White et al. 2014; Mazefsky et al. 2013) and psychiatric symptoms (Edwards et al. 2003). It is likely that the association of mental health concerns and ACEs in ASD is bidirectional, with more psychopathology increasing vulnerability to adversity and vice versa. These findings point to an important connection between mental health conditions and adversities in children with ASD that may shape their overall health and life trajectory (Kerns et al. 2015b). Future research should evaluate how improved understanding, screening, prevention and treatment of these issues, including the under-studied phenomena of adversity and trauma (Kerns et al. 2015b; Hoover 2015), might reduce not only individual and family impairment, but also the societal impact of ASD.

Acknowledgments We are grateful to the families who participated in this research.

Author Contributions CMK conceived of the study, participated in its design, interpretation of data and drafted and finalized the manuscript; CJN and SB participated in the interpretation of the data and revision of the manuscript; BKL participated in the design of the study, performed the statistical analysis and contributed to the drafting of the manuscript. All authors read and approved the final manuscript.

Funding This study was funded by the National Institute for Child and Human Development (K23 HD087472).

Compliance with Ethical Standards

Conflict of interest All authors have received research funding from NIH. Dr. Berkowitz has also received funding from SAMHSA. The authors report no other conflicts of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

Informed Consent Informed consent was obtained from all individual participants included in the study.

References

Adams, R. E., et al. (2014). Using self-and parent-reports to test the association between peer victimization and internalizing symptoms in verbally fluent adolescents with ASD. *Journal of Autism and Developmental Disorders, 44*(4), 861–872.

Ahmedani, B. K., & Hock, R. M. (2012). Health care access and treatment for children with co-morbid autism and psychiatric conditions. *Social Psychiatry and Psychiatric Epidemiology, 47*(11), 1807–1814.

Berg, K. L., Shiu, C. S., Acharya, K., Stolbach, B. C., & Msall, M. E. (2016). Disparities in adversity among children with autism spectrum disorder: a population—based study. *Developmental Medicine and Child Neurology, 58*, 1124–1131.

Blumberg, S. J., Bramlett, M. D., Kogan, M. D., Schieve, L. A., Jones, J. R., & Lu, M. C. (2013). Changes in prevalence of parent-reported autism spectrum disorder in school-aged US children: 2007 to 2011–2012. *National Health Statistics Reports, 65*, 1–7.

Blumberg, S. J., Foster, E. B., Frasier, A. M., Satorius, J., Skalland, B. J., Nysse-Carris, K. L., et al. (2012). Design and operation of the National Survey of Children's Health, 2007. *Vital and Health Statistics. Ser. 1, Programs and Collection Procedures, 55*, 1–149.

Blumberg, S. J., Olson, L., Frankel, M. R., Osborn, L., Srinath, K. P., & Giambo, P. (2005). Design and operation of the National Survey of Children's Health, 2003. *Vital and Health Statistics. Ser. 1, Programs and Collection Procedures, 43*, 1–131.

Child and Adolescent Health Measurement Initiative (2013). "Overview of Adverse Child and Family Experiences among US Children." Data Resource Center, supported by Cooperative Agreement 1-U59-MC06980-01 from the U.S. Department of Health and Human Services, Health Resources and Services Administration (HRSA), Maternal and Child Health Bureau (MCHB). Available at http://www.childhealthdata.org. Retrieved on 11/29/2016 from http://www.childhealthdata.org/docs/drc/aces-data-brief_version-1-0.pdf?Status=Master.

Conroy, K., Sandel, M., & Zuckerman, B. (2010). Poverty grown up: How childhood socioeconomic status impacts adult health. *Journal of Developmental and Behavioral Pediatrics, 31*, 154–160.

Daniels, J. L., Forssen, U., Hultman, C. M., Cnattingius, S., Savitz, D. A., Feychting, M., & Sparen, P. (2008). Parental psychiatric disorders associated with autism spectrum disorders in the offspring. *Pediatrics, 121*, e1357–e1362.

Developmental Disabilities Monitoring Network (2014). Prevalence of autism spectrum disorder among children aged 8 years-autism and developmental disabilities monitoring network, 11 sites, United States, 2010. *Morbidity and mortality weekly report. Surveillance summaries* Washington, DC, *63*(2), 1.

Edwards, V. J., Holden, G. W., Felitti, V. J., & Anda, R. F. (2003). Relationship between multiple forms of childhood maltreatment and adult mental health in community respondents: results from the adverse childhood experiences study. *American Journal of Psychiatry, 160*(8), 1453–1460.

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., et al. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine, 14*, 245–258.

Flynn, A. B., Fothergill, K. E., Wilcox, H. C., Coleclough, E., Horwitz, R., Ruble, A., et al. (2015). Primary care interventions to prevent or treat traumatic stress in childhood: A systematic review. *Academic Pediatrics, 15*, 480–492.

Freedman, B. H., Kalb, L. G., Zablotsky, B., & Stuart, E. A. (2012). Relationship status among parents of children with autism spectrum disorders: a population-based study. *Journal of Autism and Developmental Disorders, 42*, 539–548.

Hartley, S. L., Barker, E. T., Seltzer, M. M., Floyd, F., Greenberg, J., Orsmond, G., & Bolt, D. (2010). The relative risk and timing of divorce in families of children with an autism spectrum disorder. *Journal of Family Psychology, 24*(4), 449.

Hoover, D. W. (2015). The effects of psychological trauma on Children with autism spectrum disorders: A research review. *Review Journal of Autism and Developmental Disorders, 2*, 287–299.

Kerns, C. M., Kendall, P. C., Zickgraf, H., Franklin, M. E., Miller, J., & Herrington, J. (2015a). Not to be overshadowed or overlooked: Functional impairments associated with comorbid anxiety disorders in youth with ASD. *Behavior Therapy, 46*, 29–39.

Kerns, C. M., Newschaffer, C. J., & Berkowitz, S. J. (2015b). Traumatic childhood events and autism spectrum disorder. *Journal of Autism and Developmental Disorders, 45*, 3475–3486.

Kogan, M. D., Strickland, B. B., Blumberg, S. J., Singh, G. K., Perrin, J. M., & van Dyck, P. C. (2008). A national profile of the health care experiences and family impact of autism spectrum disorder among children in the United States, 2005–2006. *Pediatrics, 122*, e1149–e1158.

Marie-Mitchell, A., & O'Connor, T. G. (2013). Adverse childhood experiences: translating knowledge into identification of children at risk for poor outcomes. *Academic Pediatrics, 13*, 14–19.

Marie-Mitchell, A., Studer, K. R., & O'Connor, T. G. (2016). How knowledge of adverse childhood experiences can help pediatricians prevent mental health problems. *Families Systems and Health, 34*, 128.

Mazefsky, C. A., Herrington, J., Siegel, M., Scarpa, A., Maddox, B. B., Scahill, L., & White, S. W. (2013). The role of emotion regulation in autism spectrum disorder. *Journal of the American Academy of Child and Adolescent Psychiatry, 52*, 679–688.

Newschaffer, C. J., Croen, L. A., Daniels, J., Giarelli, E., Grether, J. K., Levy, S. E., et al. (2007). The epidemiology of autism spectrum disorders*. *Annual Review of Public Health, 28*, 235–258.

Rigles, B. (2016). The relationship between adverse childhood events, resiliency and health among children with autism. *Journal of Autism and Developmental Disorders*. doi:10.1007/s10803-016-2905-3.

Simonoff, E., Pickles, A., Charman, T., Chandler, S., Loucas, T., & Baird, G. (2008). Psychiatric disorders in children with autism spectrum disorders: prevalence, comorbidity, and associated factors in a population-derived sample. *Journal of the American Academy of Child and Adolescent Psychiatry, 47*, 921–929.

Tiet, Q. Q., Bird, H. R., Davies, M., Hoven, C., Cohen, P., Jensen, P. S., & Goodman, S. (1998). Adverse life events and resilience. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*, 1191–1200.

van Steensel, F. J., Bögels, S. M., & Dirksen, C. D. (2012). Anxiety and quality of life: Clinically anxious children with and without autism spectrum disorders compared. *Journal of Clinical Child and Adolescent Psychology, 41*, 731–738.

White, S. W., Mazefsky, C. A., Dichter, G. S., Chiu, P. H., Richey, J. A., & Ollendick, T. H. (2014). Social-cognitive, physiological, and neural mechanisms underlying emotion regulation impairments: Understanding anxiety in autism spectrum disorder. *International Journal of Developmental Neuroscience, 39*, 22–36.