Title

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Journal

Early Intervention in Psychiatry, 14(6)

ISSN

1751-7885

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Publication Date

2020-12-01

DOI

10.1111/eip.12931

Peer reviewed

HHS Public Access

Author manuscript

Early Interv Psychiatry. Author manuscript; available in PMC 2021 December 01.

Published in final edited form as:

Early Interv Psychiatry. 2020 December ; 14(6): 755–761. doi:10.1111/eip.12931.

Contributions of childhood trauma and atypical development to increased clinical symptoms and poor functioning in recent onset psychosis

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Abstract

Aim—The trauma-psychosis cycle proposes an interactive relationship between impaired developmental and cognitive trajectory, childhood trauma exposure, and increased risk for psychosis. This study explored how childhood trauma (CT) and atypical development (AD) impact clinical course in an early psychosis cohort.

Methods—A retrospective chart review of behavioural and clinical research data was conducted with individuals ages 12 to 40 (N = 508; 72.4% males) evaluated by an early psychosis program.

Results—CT exposure was associated with earlier onset of full threshold psychosis, more hospitalizations, higher ratings of negative symptoms, and increased likelihood of engaging in suicidal behaviour. AD alone was associated with earlier onset of psychosis symptoms, higher ratings of negative symptoms and greater likelihood of engaging in non-suicidal self-injury. The combination of CT and AD was associated with the earliest symptom onset and poorest psychosocial functioning.

Conclusions—The findings contribute to our understanding of heterogeneity in the early psychosis population and highlight the specific risk factors that could be targets in treatment.

Keywords

atypical development; childhood trauma; clinical course; early psychosis

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CONFLICT OF INTEREST

Tara Niendam and Laura Tully are co-founders and shareholders in Safari Health, Inc.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

INTRODUCTION

Two lines of evidence suggest atypical development (AD) and childhood trauma (CT) contribute to heterogeneity in risk, clinical course and outcome among individuals with psychosis. First, individuals with psychosis have high comorbidity rates of cognitive and developmental disorders (ie, attention-deficit/ hyperactivity disorder and autism spectrum disorders; Stahlberg, Soderstrom, Rastam, & Gillberg, 2004) and early childhood delays in language and motor development (Barch et al., 2017; Cannon et al., 2002; Laurens & Cullen, 2016; Macmanus et al., 2012; Parellada, Gomez-Vallejo, Burdeus, & Arango, 2017). Additionally, psychosis is associated with widespread neurocognitive impairments in global intellectual functioning, verbal and nonverbal memory, attention, executive functioning and motor performance (Flashman & Green, 2004). Consistent with the neurodevelopmental model of schizophrenia (Feinberg, 1982; Murray & Lewis, 1987; Walker & Diforio, 1997; Weinberger, 1987), psychotic disorders are proposed to arise from the interaction between early neurological insults or genetic risk factors and subsequent environmental stressors that contribute to the expression of psychosis, with varying degrees of cognitive deficit, clinical symptoms, and functional impairment (Rapoport, Giedd, & Gogtay, 2012).

Second, consistent with this model, exposure to CT may represent a key environmental stressor associated with increased psychosis risk (Addington et al., 2013; Arseneault et al., 2011; Kelleher et al., 2013; Mayo et al., 2017), higher relapse rates (Cotter, Kaess, & Yung, 2015), and poorer long-term functioning (Petros et al., 2016). These findings suggest a cyclical pattern implicating CT, AD, and psychosis (Figure 1). The trauma-psychosis cycle (Mayo et al., 2017) proposes that, in conjunction with neurobiological and/or genetic risk, CT represents an environmental stressor that derails developmental course, contributing to impaired cognition and functioning, subsequently increasing vulnerability to future stressors (Lardinois, Lataster, Mengelers, Van Os, & Myin-Germeys, 2011; Schenkel, Spaulding, DiLillo, & Silverstein, 2005; Shannon et al., 2009). Alterations in development are associated with the consequences of CT exposure include changes in cognition, such as impaired executive functioning (Kavanaugh, Dupont-Frechette, Jerskey, & Holler, 2017), as well as poor social engagement and/or academic performance. Both of these subsequently increase vulnerability to future stressors and risk for psychosis onset (Kim et al., 2011). AD is associated with similar challenges in cognition and functioning, suggesting that individuals with AD may incur similar risk for psychosis. With the onset of psychosis symptoms, individuals are further impaired in their adaptive coping and thus more vulnerable to future adversity. Furthermore, as neurocognitive function, childhood trauma exposure, and psychosis are all implicated in risk for suicidal behaviours (Akyuz, Sar, Kugu, & Doğan, 2005; Grattan, Tully, Lesh, Carter, & Niendam, 2019; Lopez-Garcia et al., 2019; Pompili et al., 2011; Richard-Devantoy, Berlim, & Jollant, 2014), self-harm behaviours are a critical domain to examine in this complex and high-risk population. As such, the current study examined suicide attempts and non-suicidal self-injurious behaviours (NSSIB). Examination of the relationship between AD, CT, and psychosis could inform treatment and elucidate the contributing factors for heterogeneity in illness course, namely psychosis symptom trajectory and severity, and overall functioning.

We conducted a retrospective chart review to examine the distinct and combined impact of CT and AD on the clinical presentation of individuals experiencing recent onset of psychosis.

Compared to individuals who have experienced neither CT nor AD, we predicted that distinct experiences of either CT or AD would be associated with an earlier age at onset of psychosis as well as a history of increased hospitalization, increased self-harm behaviours, and poorer psychosocial functioning prior to presentation for care. Furthermore, we predicted that individuals who report both CT and AD would be at the greatest disadvantage across these measures.

METHODS

Participants were recruited from the UC Davis Early Psychosis (UCD EP) programs and the Sacramento area as part of a larger study (PI: Carter, NIMH 5R01MH059883). Eligible individuals (ages 12-40) had a Wechsler Abbreviated Scale Intelligence score > 70 (Wechsler, 1999) and psychosis onset within 2 years prior to intake, according to the Structured Clinical Interview for DSM-IV (First, Spitzer, Gibbon, & Williams, 1996). A standardized retrospective chart review of behavioural and clinical research data, conducted by research staff and supervised by T.A.N, provided data on demographics, developmental, trauma, and medical history. Date of psychosis onset, defined as point at which psychosis symptoms reached full threshold due to significant distress or impact on functioning (SIPS; McGlashan, 2001), was based on all available data. While participants were not systematically asked about CT or AD, researchers documented presence of these variables if they were mentioned anywhere in the chart materials. AD was noted when records mentioned an early developmental delay (eg, speech, motor) or any suspected or diagnosed neurodevelopmental disorders (ie, attention-deficit/hyperactivity disorder; ADHD, autism spectrum disorders; ASD, or pervasive developmental disorder: PDD, per DSM-IV). Presence of CT was noted for individuals whose charts included mention of physical or sexual abuse, neglect, emotional or verbal abuse, bullying, or indirect exposure to violence (e.g., witnessing domestic violence) in their youth (i.e., prior to age 25). “Suspected trauma” was coded if clinical or physical indications of trauma were noted, but exposure was not explicitly confirmed. Clinician-rated measures of symptoms at intake (Brief Psychiatric Rating Scale [BPRS; Lukoff, Nuechterlein, & Ventura, 1986], Scale for the Assessment of Positive Symptoms [SAPS; Andreasen, 1984], Scale for the Assessment of Negative Symptoms [SANS; Andreasen, 1984], global functioning (Global Assessment of Functioning [GAF; Hall, 1995]), social and role functioning at intake and the highest/lowest in the year prior to intake (Global Functioning: Role and Global Functioning: Social [Cornblatt et al., 2007]), and the Columbia-Suicide Severity Rating Scale (CSSRS; Posner et al., 2008) were also examined.

Data were checked for outliers and non-normal data were transformed or non-parametric tests were used. T-tests, ANOVAS, and $\chi 2$ tests were used to examine group differences between key variables related to clinical course using IBM SPSS Statistics (Version 25.0). Significance level was established at $P < .05$, with notable trends reported for $P < .10$.

RESULTS

See Table 1 for participant demographics. A total of 151 (30.0%) individuals endorsed a history of at least one type of AD, including a formal or suspected diagnosis of developmental delay (n = 55, 11.0%), specific learning disorder (n = 113, 23.1%), ADHD (n = 65, 13.1%), and PDD or ASD (n = 18, 3.7%; Table 2). Individuals with any kind of AD experienced an earlier age at onset of full-threshold psychotic symptoms (M = 18.08, SD = 4.26) compared to individuals who did not report AD (M = 20.02, SD = 4.21; t[460] = 4.53, P < .001). AD individuals were also more likely to report engaging in NSSIB (χ2[2] = 7.131; P = .008). AD individuals had higher SANS scores (M = 9.56, SD = 4.27) than individuals with no AD (M = 8.49, SD = 4.08; t[398] = −2.29, P = .02) but no other differences in clinical scores were found (Table 3).

Seventy (13.9%) individuals indicated a history of CT exposure, including 22 (4.3%) with "suspected trauma." Trauma types in order of frequency were: sexual abuse (n = 43, 30.9%), witnessed domestic or community violence (n = 31, 22.3%), physical abuse or a physical attack (n = 19, 13.7%), bullying (n = 9, 1.8%), emotional or verbal abuse (n = 11, 7.9%) and physical or emotional neglect (n = 4, 0.8%; Table 2). Over half of individuals were below age 12 at the time of their first traumatic experience (n = 40, 74.1%). CT individuals had an earlier age at psychosis onset compared to those without CT (Mann-Whitney U = 10 428.50, P = .04). CT individuals also endorsed more psychiatric hospital or emergency department visits (Mann- Whitney U = 12 225.00, P = .005), but were less likely to have made a suicide attempt than individuals without CT (χ2[2] = 8.83; P = .003). No significant differences in clinical symptoms at intake (SAPS, SANS, BPRS) were found between individuals with and without CT (Table 3).

To examine the combined impact of CT and AD, participants were divided into four groups: 1) those with recorded AD only (n = 122), 2) those with CT only (n = 41), 3) those with both CT + AD (n = 29), and 4) those with neither CT nor AD (n = 312). Individuals in the CT + AD group had the earliest age at onset of psychosis (H[3] = 20.01, P < .001; Figure 2). They also had the poorest global functioning at intake (F[3, 331] = 2.62, P = .05). When the highest level of role functioning in the year prior to intake was examined across the four groups, the CT + AD individuals' role functioning was significantly lower than the other three groups (F[3167] = 3.99, P = .003; (Figure 3). There was a trend for CT + AD to have poorest social functioning at intake (H[3166] = 2.31, P = .08); however, this did not reach statistical significance Figure 4). CT + AD individuals also had the higher rates of psychiatrist hospital/ED visits (H[3] = 8.03, P = .05) compared to the other three groups. No significant differences in clinical symptoms at intake (SAPS, SANS, BPRS) were found between groups (Table 3).

DISCUSSION

Both CT and AD are independently associated with poorer clinical symptoms and functioning in early psychosis at initial presentation for early psychosis care. AD alone was associated with an earlier age at psychosis onset, greater likelihood of NSSIB, and higher ratings of negative symptoms. CT alone was associated with earlier age at psychosis onset

and more hospitalizations. Combined experiences of CT and AD, although not associated with psychosis symptom ratings, are associated with the earliest age at symptom onset and poorest psychosocial functioning prior to presenting for care. This finding supports the notion that CT may alter one's developmental trajectory, both in terms of neurocognitive development and functioning, which in turn have implications for the development of psychopathology (Mayo et al., 2017). Research also suggests that AD increases vulnerability to trauma exposure: children enrolled in special education are at higher risk for abuse than their peers (Algood, Hong, Gourdine, & Williams, 2011).

Alternatively, individuals with AD may have less sophisticated coping mechanisms due to cognitive and developmental deficits, making them more vulnerable after CT exposure. Research has shown that strong cognitive abilities may boost resiliency among maltreated youth (Herrenkohl, Herrenkohl, & Egolf, 1994), putting AD youth at higher risk for psychopathology following CT than their typically developing peers. As the current study had an IQ cutoff of 70, it is possible that the impact of global cognitive functioning on these clinical outcomes are underreported here. Aligned with the proposed trauma-psychosis cycle, derailed developmental course may be even more pronounced in individuals with lower intellectual functioning, placing those individuals at even higher risk than what is captured in the current study. Future research should explore other impairments associated with AD (eg, low global IQ, social skills, emotional intelligence, social cognition, maturity) to understand their role in coping and increased risk for youth with both AD and CT history.

Furthermore, specific aspects of trauma are associated with varying degrees of risk. For example, prior research suggests that the age at which trauma exposure occurred may increase risk; early childhood exposure (ages 0-5) poses greater threat to development (Keiley, Howe, Dodge, Bates, & Pettit, 2001) compared to exposure at an older age. Additionally, trauma that is interpersonal in nature (ie, physical abuse perpetrated by a caregiver versus a natural disaster) is associated with higher rates of PTSD (Alisic et al., 2014). Due to small sample sizes within each trauma category and a lack of information on age at exposure, the current study was limited in its ability to examine how specific types of CT contribute to this interplay differently. Such details should be examined in future studies.

While this study had a substantial sample size, rates of CT reported here are lower than expected given previously reported prevalence rates ranging from 28% to 73% in an early psychosis population (Bendall, Jackson, Hulbert, & McGorry, 2007). This is likely due to the nature of retrospective data collection and that CT was not directly assessed. Although research is limited, rates of AD reported here were consistent with prior reported prevalence of learning disorders around 30% in a sample of individuals with schizophrenia (Hollis, 2003). Future research should use standardized evaluations to examine the impact of specific CT and AD categories on clinical course in early psychosis and individuals at clinical high risk, as well as the role of developmental and contextual protective factors, such as engagement with services, cognitive, social and emotional intelligence and family dynamics. Furthermore, the current study only examined clinical symptoms at initial presentation for early psychosis care. Future studies should examine longer-term trajectories of clinical course for those with combined risk factors.

Thorough assessment of clients' developmental history and adverse childhood events may help clinicians identify important factors to consider for treatment, thereby improving clinical outcomes. Targeted developmental interventions, such as social skills development and school remediation, are key for AD individuals. Developmental approaches to early psychosis treatment are not typically discussed in the coordinated specialty care model; these results suggest the importance of doing so. Given the risk associated with CT (Springer, Sheridan, Kuo, & Carnes, 2007), trauma-focused interventions should also be included when appropriate (Cragin, Straus, Blacker, Tully, & Niendam, 2017). Among CT youth, family support predicts resilience and emotional well-being (Masten et al., 1999) and acts as a moderating factor between trauma exposure and the onset of PTSD (Day, 2013). Similarly, for AD youth, targeting family functioning and support is believed to yield the most successful outcomes via reductions in parent stress and increases in positive parenting (Dempsey, Keen, Pennell, O'Reilly, & Neilands, 2009). This suggests that CT + AD groups would benefit greatly from the incorporation of family support and involvement into early psychosis care.

This study reinforces the notion that early psychosis populations have a diverse set of risk factors impacting clinical presentation at initial presentation to care. To understand aetiology and for improving clinical interventions, the relationship between AD, CT and psychosis should continue to be explored.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the support of the research participants and families, who helped to make this work possible. This research was supported by the NIMH with 1K23MH087708 to T.A.N., 5R01MH059883 to C.S.C., and the Building Interdisciplinary Research Careers in Women's Health award (K12 HD051958) awarded to L.M.T funded by the National Institute of Child Health and Human Development (NICHD), Office of Research on Women's Health, Office of Dietary Supplements, and the National Institute of Aging.

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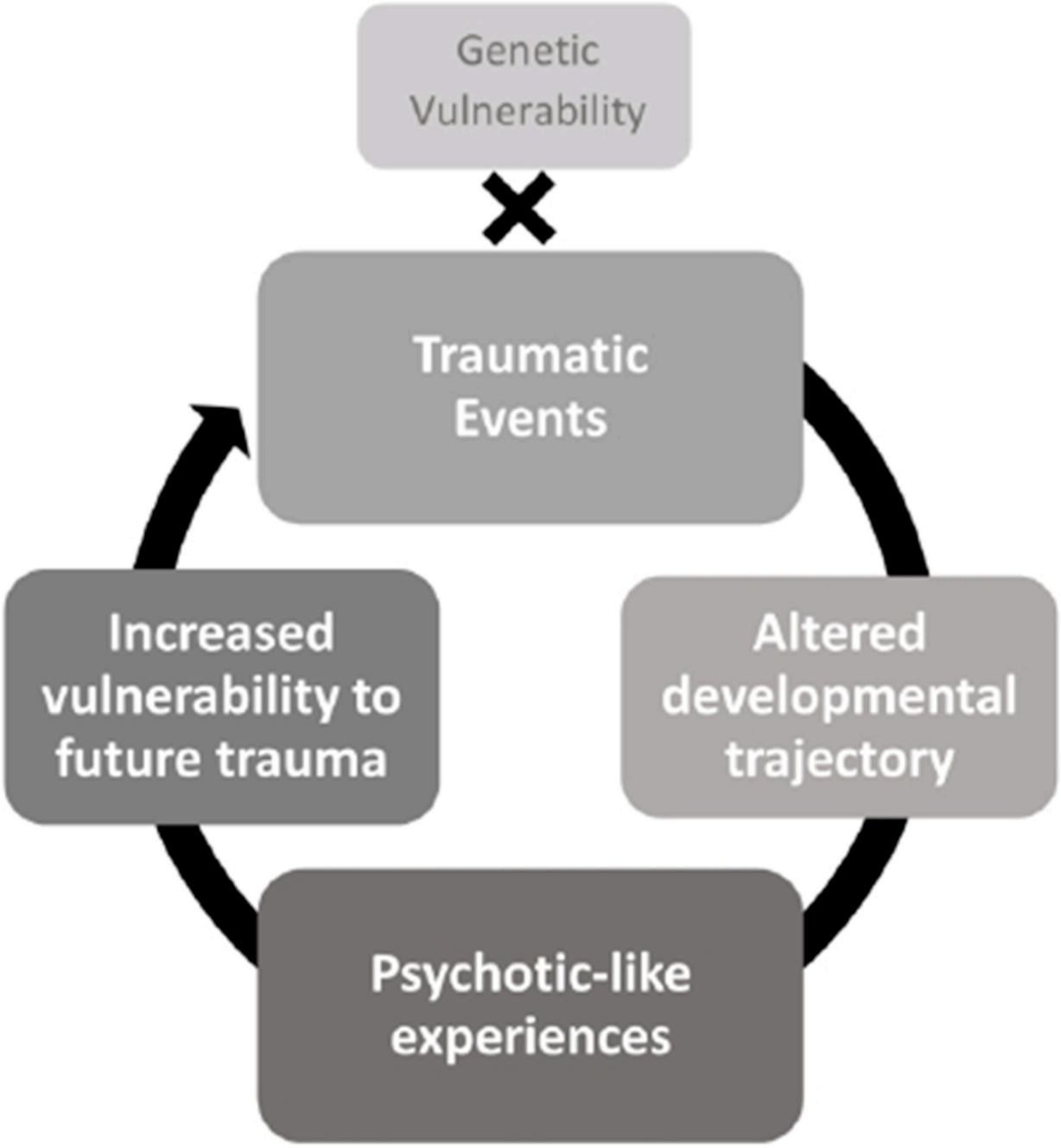

Figure 1.
A proposed model for the link between trauma and psychosis, adapted from Mayo et al., 2017.

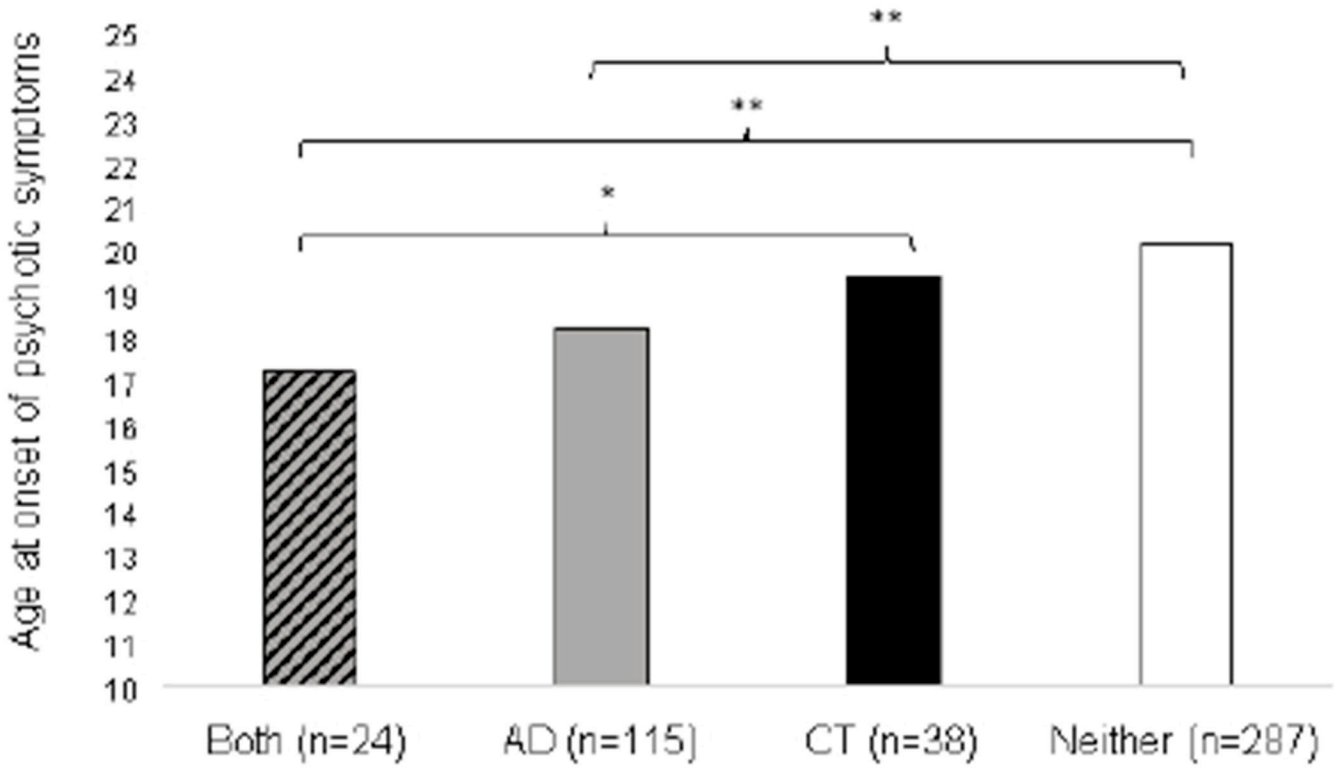

Figure 2.

The age of psychosis onset by group

*p < .05

**p < .01

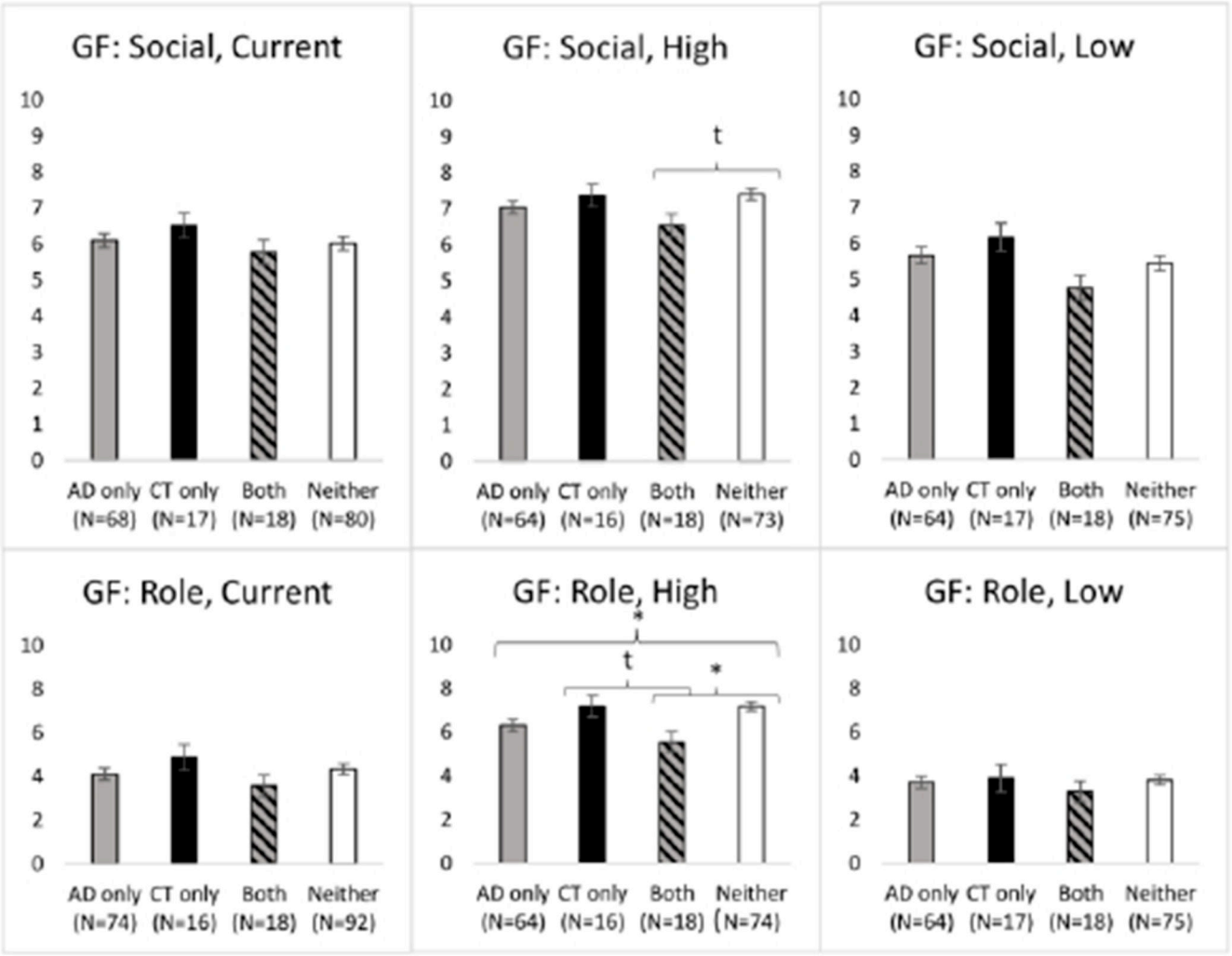

Figure 3.

Global social and role functioning by group

Note. “Current” refers to ratings of participant’s current social and role functioning. “High” refers to ratings of participant’s highest functioning in the past year, and “Low” refers to ratings of the participant’s lowest functioning in the past year.

t = trend ($p<0.1$)

*$p < .05$

**$p < .01$

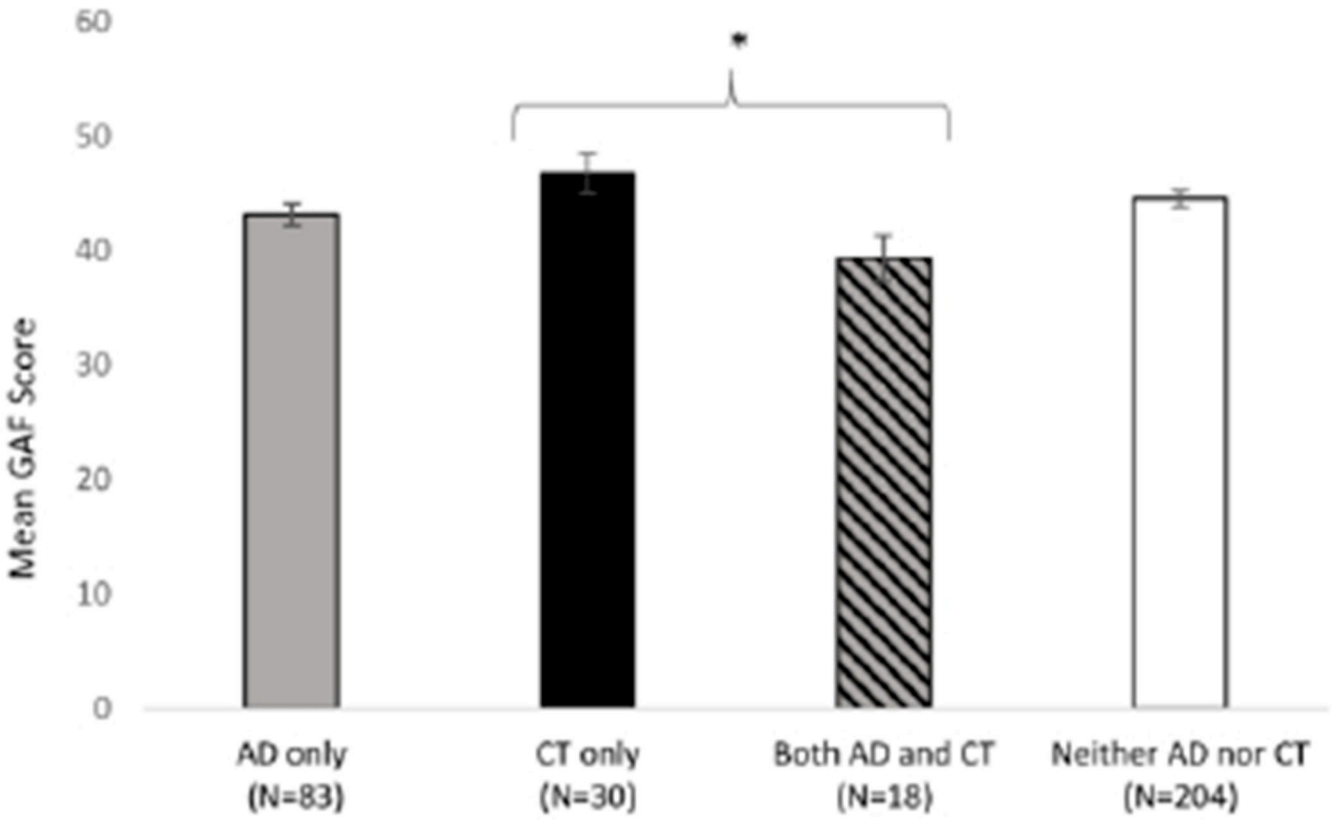

Figure 4.
Global assessment of functioning (GAF Score) by group
*p < .05
** p < .01

Table 1.

Participant Demographics

Demographics	Combined Sample (N=508)	AD Only (N=124)	CT Only (N=41)	CT+AD (N=29)	Neither (N=314)	Statistical Differences
Age at intake, **M (SD)**	20.04 (4.26)	18.71 (3.94)	19.73 (4.16)	17.87 (3.43)	20.82 (4.28)	*** Neither > AD
Estimated WASI IQ, **M (SD)**	98.82 (4.33)	98.14 (16.88)	98.11 (14.63)	93.96 (11.78)	99.67 (14.288)	--
Caregiver 1/Mother years of education, **M (SD)**	13.65 (3.39)	13.45 (3.50)	12.89 (3.10)	12.11 (3.364)	13.95 (3.36)	--
Caregiver 2/Father years of education, **M (SD)**	13.77 (3.90)	13.82 (3.90)	12.88 (3.60)	12.41 (2.58)	13.96 (3.93)	--
Male gender, **N (%)**	368 (58.4)	96 (77.40)	23 (56.1)	18 (62.1)	231 (73.6)	--
Hispanic **, N (%)**	77 (12.2)	29 (23.4)	4 (9.8)	5 (17.2)	39 (12.4)	--
Asian or Pacific Islander**, N (%)**	67 (10.7)	1 (13.8)	10 (24.4)	4 (13.7)	36 (11.4)	--
Native American**, N (%)**	8 (1.3)	2 (1.6)	2 (4.9)	4 (13.8)	0	--
African American**, N (%)**	81 (12.9)	24 (19.4)	4 (9.8)	9 (31.0)	44 (14.0)	--
Caucasian**, N (%)**	292 (46.3)	64 (51.6)	21 (51.2)	10 (34.5)	197 (62.7)	--
More than one race**, N (%)**	51 (8.1)	14 (11.3)	4 (9.8)	2 (6.9)	31 (9.9)	--
Primary DSM-IV Diagnosis at Intake, N (%)						
Schizophrenia	118 (18.7)	30 (24.2)	14 (34.1)	3 (10.3)	71 (22.6)	--
Schizoaffective Disorder	43 (6.8)	8 (6.5)	4 (9.8)	2 (6.9)	29 (9.2)	--
Schizophreniform Disorder	134 (21.3)	31 (25.0)	9 (22.0)	5 (17.2)	89 (28.3)	--
Bipolar Disorder	65 (10.3)	12 (9.7)	8 (19.5)	3 (10.3)	42 (13.4)	--
Major Depressive Disorder w/ psychotic features	24 (3.8)	6 (4.8)	1 (2.4)	4 (13.8)	13 (4.1)	--
Psychotic Disorder NOS	53 (8.4)	14 (11.3)	3 (7.3)	5 (17.2)	31 (9.9)	--
Unknown	16 (2.5)	4 (3.2)	0	1 (3.4)	4 (1.2)	--

* p<.05,

** p<.01,

*** p<.001

Table 2.

Frequencies of AD and CT in sample.

Atypical Development, N (%)	**All AD**	**AD only**
Developmental Delay	55 (11.0)	42 (34.4)
Specific Learning Disorder	113 (23.1)	83 (68.0)
ADHD	65 (13.1)	50 (41.0)
PDD or ASD	18 (3.7)	14 (11.5)
Childhood Trauma, N (%)	**All CT**	**CT only**
Suspected trauma	22 (4.4)	4 (36.4)
Sexual abuse	43 (30.9)	5 (45.5)
Witness domestic or community violence	31 (22.3)	6 (54.5)
Physical abuse or attack	19 (13.7)	0 (0)
Bullying	9 (1.8)	4 (36.4)
Physical or emotional neglect	4 (0.8)	0 (0)
Emotional or verbal abuse	11 (7.9)	2 (18.2)

Note: “AD only” refers to participants who had AD in the absence of CT, while “All AD” refers to participants who had AD with or without CT in addition. The same distinction applies for “All CT” versus “CT only.” Specific Learning Disorder encompasses disorders in reading, writing, and mathematics. PDD classification was based on DSM-IV criteria.

Table 3.

Participant Clinical Characteristics

	Entire Sample (n=504)	Neither AD nor CT	AD	No AD	Statistical Differences	CT	No CT	Statistical Differences
SAPS Total Score, **M (SD)**	5.41 (0.18)	4.77 (0.47	5.13 (0.32)	5.53 (0.22)		4.92 (3.55)	5.61 (3.90)	--
SANS Total Score, **M (SD)**	8.77 (0.21)	8.13 (0.54)	9.56 (0.42)	8.48 (0.24)	*AD > No AD	7.97 (4.06)	8.56 (4.09)	--
BPRS Total Score, **M (SD)**	42.76 (0.56)	41.27 (1.74)	43.80 (1.14)	42.35 (0.66)	--	43.31 (12.06)	42.22 (10.10)	--
Age at psychosis onset, **M (SD)**	19.44 (0.20)	19.07 (0.51)	18.08 (0.36)	20.02 (0.23)	***No AD > AD	19.39 (3.97)	20.10 (4.24)	*CT<No CT
Number of psych hospital/ED Visits, **M (SD)**	1.06 (0.05)	1.42 (0.14)	1.11 (0.10)	1.05 (0.05)	--	1.39 (1.24)	1.00 (0.93)	*CT > No CT
Engaged in NSSIB, **N (%)**	285 (56.5)	38 (56.7)	99 (65.6)	186 (52.7)	**AD > No AD	40 (57.1)	245 (56.5)	--
Engaged in Suicide attempts, **N (%)**	41 (8.1)	7 (10.4)	16 (10.6)	25 (7.1)	--	12 (17.1)	29 (6.7)	**No CT > CT

*
p<.05,

**
p<.01,

***
p<.001