

Gender Differences in Internalizing Behaviors in Autism Spectrum Disorder: The ACE



GENDAAR Network

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Introduction

- Autism Spectrum Disorder (ASD) is a disorder characterized by social and communicative impairments.
- Children with ASD display internalizing behaviors more frequently than typically developing children.
- These behaviors are mainly characterized by negative feelings and occur at higher rates in females than males in children with ASD (Oswald, et al. 2016), however, the specific rates in each subgroup, such as anxiety, depression, or somatic complaints are less understood.
- The aims of this study were:
 - Explore gender differences in internalizing behaviors in children with ASD
 - Additionally, investigate the impact of the following factors on internalizing behaviors in children with ASD
 - Participant medication use for behavioral issues (e.g., SSRIs)
 - Symptoms of depression/anxiety in parents of participants
 - Environmental factors such as family composition, income, etc.
- We expect to see associations between these factors and internalizing behavior.

Methods

Participants

- 138 participants, aged 8-18 (76 boys, 62 girls) from the ACE GENDAAR Network, a four site NIH funded project investigating gender differences in children with ASD.
- All participants met ASD criteria on ADOS-2 and via the ADI-R.
- All participants had a nonverbal IQ over 70.

	N	Mean Age (years)	Std. Deviation	Minimum Age (years)	Maximum Age (years)
Male	76	12.39	2.89	8.00	17.91
Female	62	12.61	2.85	8.00	17.91
Total	138	12.49	2.86	8.00	17.91

Procedure and Measures Used

Parents of participants completed the Child Behavior Checklist, ACE Subject Medical History questionnaire, ACE Family Medical History questionnaire and ACE Demographics questionnaire and answered questions on child behavior, child and family medical history.

Child Behavior Checklist (CBCL)

- The CBCL checklist assesses external and internal emotional and behavioral problems in children and adolescents (higher score = higher impairment).
 - Internalizing behaviors were calculated in the following categories: somatic complaints, withdrawn/depressed, anxious/depressed and total internalizing score that encompass all of these subcategories.

ACE Subject Medical History Questionnaire

- Variables measured: participant behavioral medication use (Yes/No)

ACE Family Medical History Questionnaire

- Variables measured: Display of depression in mother/father (Yes/No)

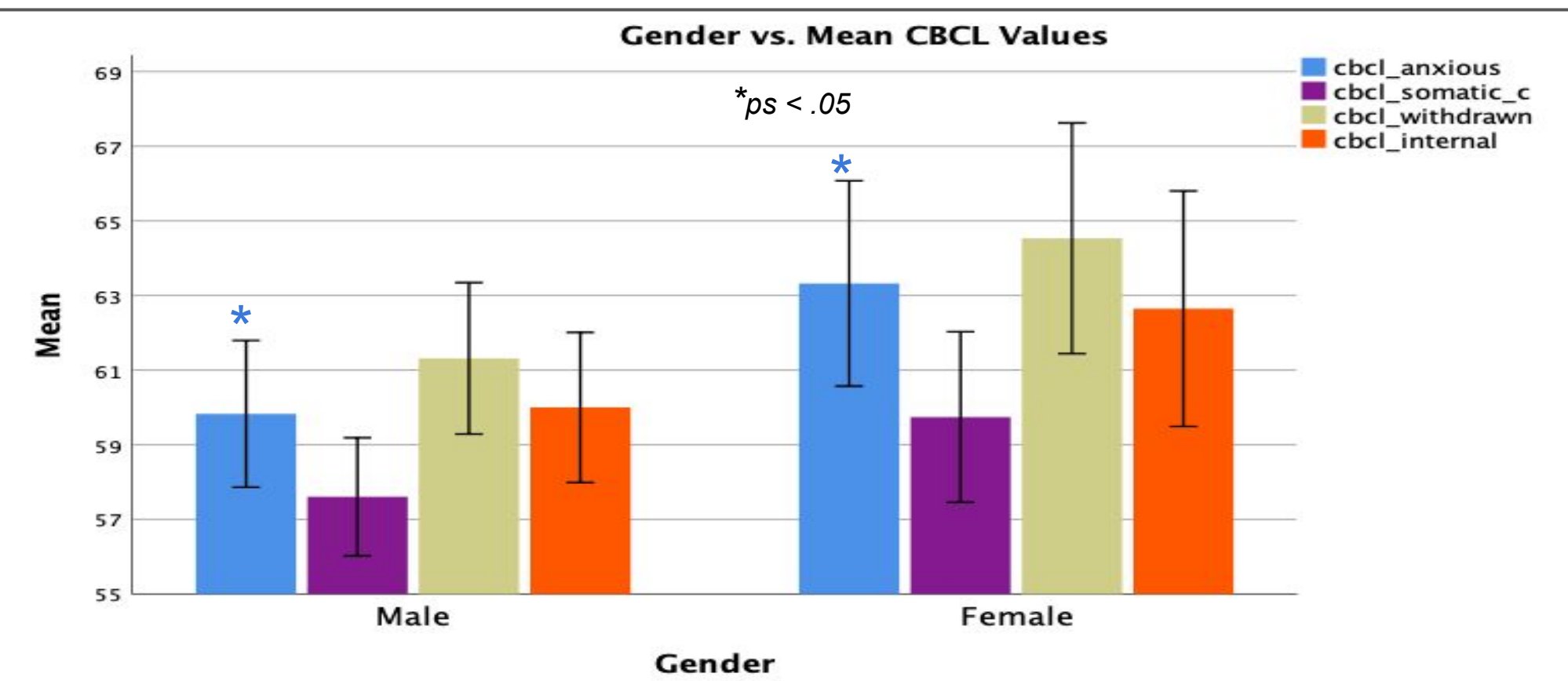
ACE Demographics Form

- Variables measured: Household where child lives (Both, Other (single, split))

Results

Q1: Are there gender differences in CBCL internalizing scores in children with ASD?

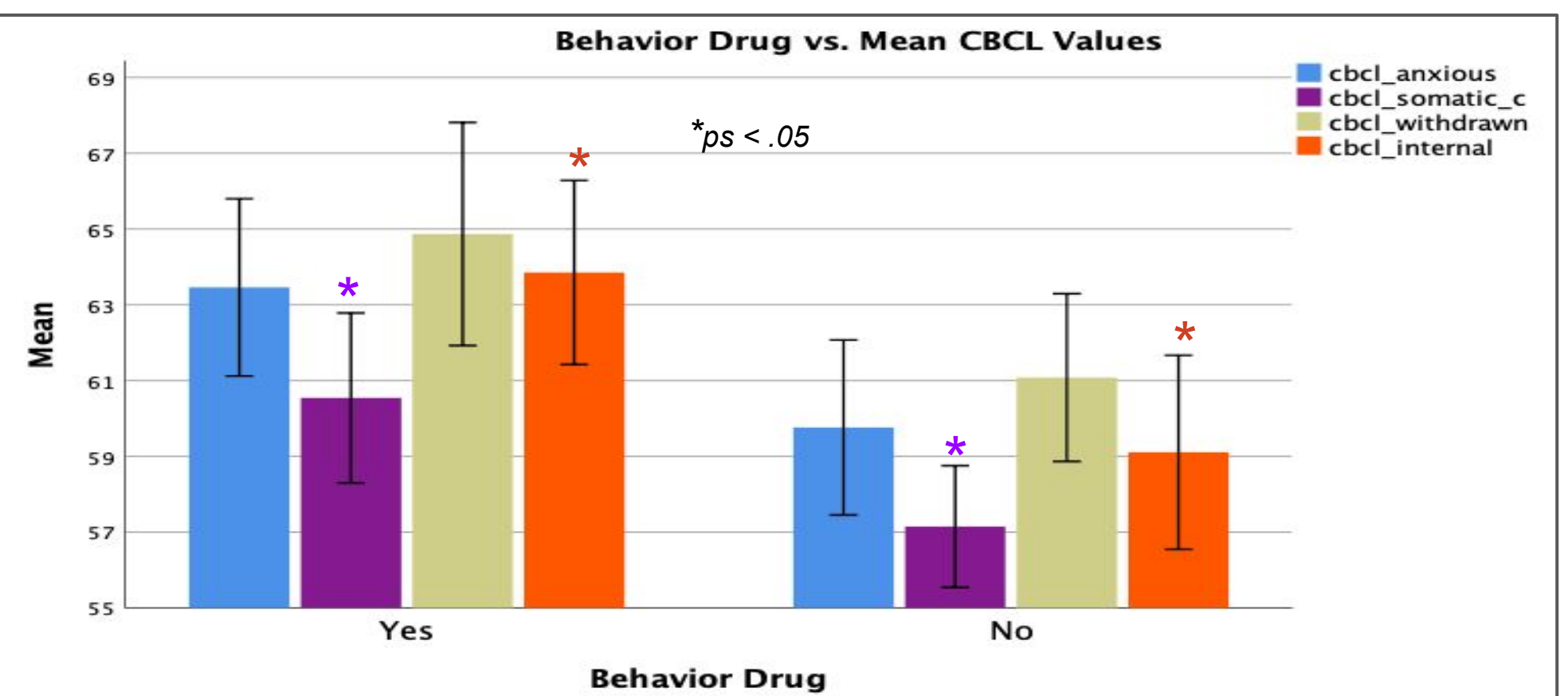
ANOVAs were implemented between CBCL internalizing scores (each category) and gender groups



While females did tend to score higher on all CBCL categories, the difference in mean CBCL score was only significant for anxious ($F = 4.46$, $p = 0.04$)

Q2: Are participant medication use and gender associated with internalizing behavior scores?

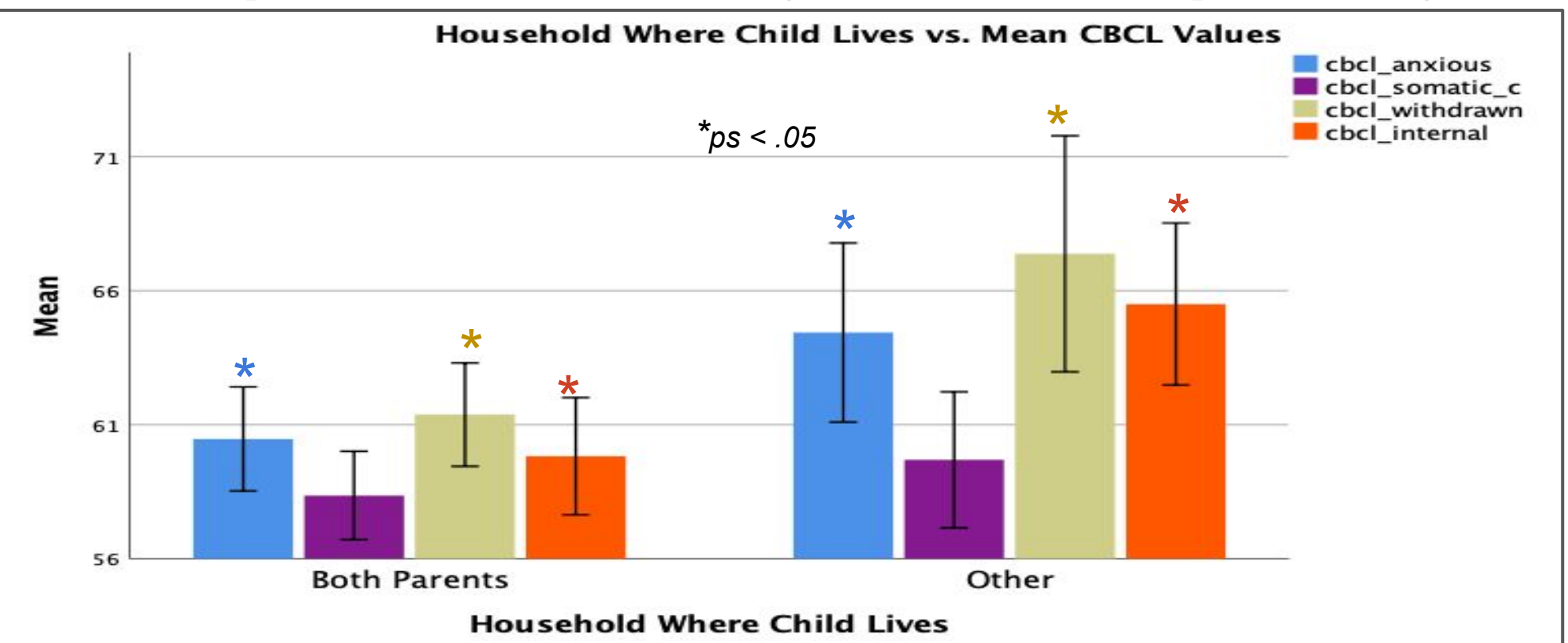
ANOVAs were implemented between internalizing scores, participant medication use and gender



Participants who were taking behavioral medications showed significantly higher CBCL scores in internal ($F = 3.58$, $p = .03$) and somatic complaints ($F = 4.02$, $p = .02$); results were insignificant for withdrawn ($F = 2.22$, $p = 0.11$) and anxious ($F = 2.48$, $p = 0.09$). Gender differences were significant only for withdrawn ($F = 4.67$, $p = 0.03$) suggesting females on behavioral medication show higher rates of withdrawn symptoms than males.

Q3: Is household composition associated with participants' internalizing behavior scores?

ANOVAs were implemented between internalizing scores, household composition and gender

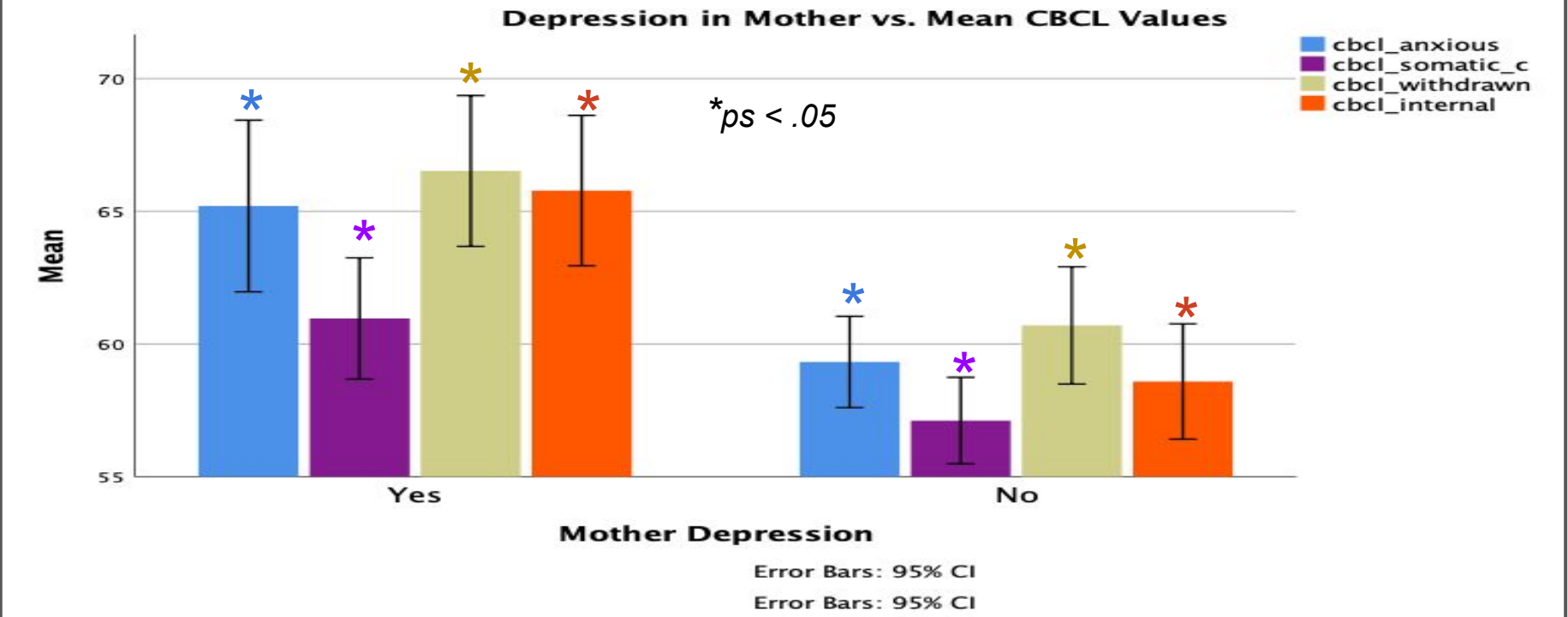


Participants who lived with both biological parents had significantly lower CBCL scores for all categories (withdrawn $F = 8.09$, $p = 0.01$; internal $F = 7.09$, $p = 0.009$; anxious $F = 4.07$, $p = 0.05$) except somatic complaints ($F = 0.66$, $p = 0.417$) than participants living in single caregiver or split households. Gender differences were significant only for withdrawn ($F = 4.17$, $p = 0.04$) with females who live with both parents showing lower withdrawn scores than males who lived with both parents.

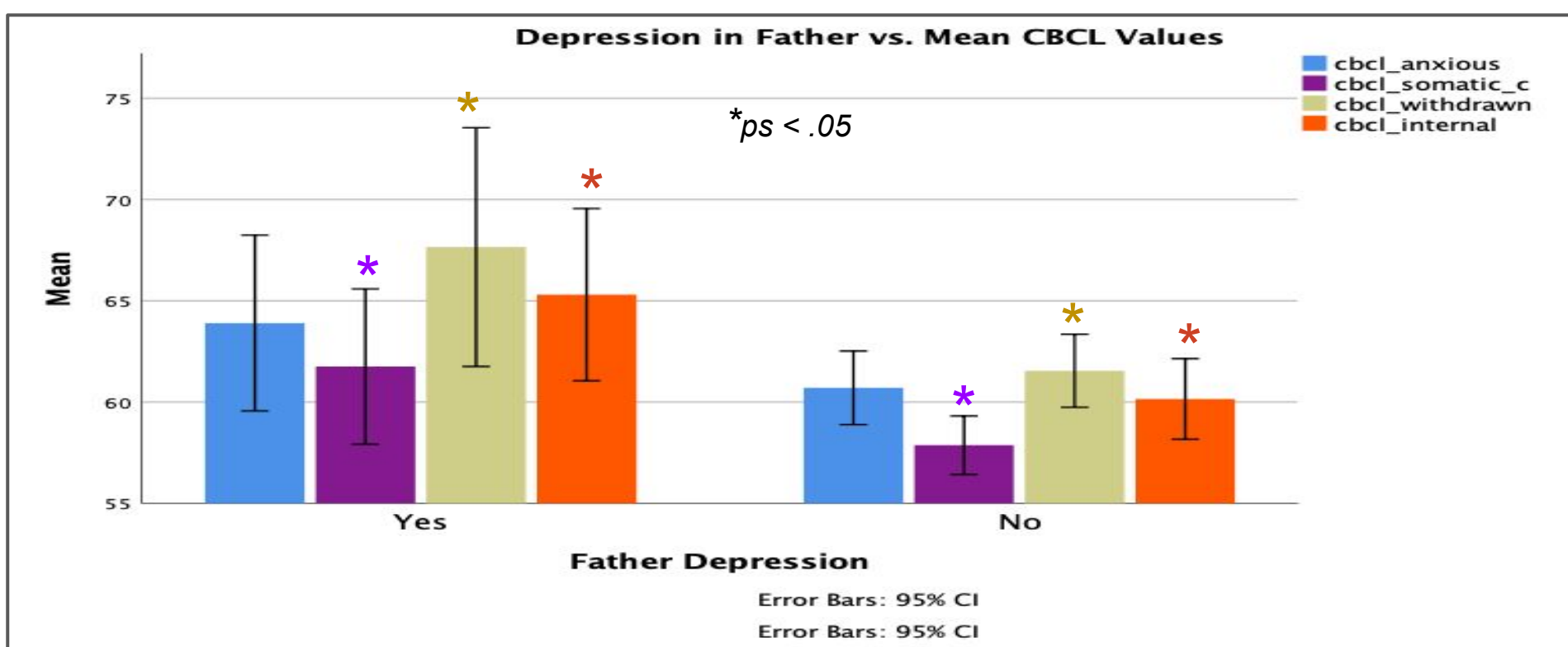
Results cont.

Q4: Are parental symptoms of depression associated with child internalizing behaviors?

ANOVAs were implemented between internalizing scores, depression reported in parents of participants and gender



CBCL scores were significantly higher for all categories for participants whose mothers displayed depression (somatic complaints $F = 7.74$, $p = .006$; withdrawn $F = 10.26$, $p < .01$; anxious $F = 12.40$, $p = .01$; internal $F = 16.06$, $p < .01$). Gender differences were significant only for internal ($F = 4.61$, $p = .03$) with females whose mothers displayed depression having higher internalizing total scores than males whose mothers also displayed depression.



CBCL scores were significantly higher for all categories for participants whose fathers displayed depression (somatic complaints $F = 4.16$, $p = .04$; withdrawn $F = 6.12$, $p = .02$; internal $F = 4.09$, $p = .05$) except anxious ($F = 1.84$, $p = .18$). No significant gender differences were observed ($p = ns$).

Discussion

- The results indicate that participant behavioral medication use, household composition, and parental medical history all had a significant association with one or more internalizing behaviors in children with ASD.
- As we hypothesized females showed slightly elevated scores in all internalizing behaviors; however with significant differences only in the anxious subscale.
- Gender differences in other factors were only significant in withdrawn category (medication use, household composition); and total internalizing score (maternal depression symptoms)
- Future research is needed to explore the factors in depth and identify additional factors such as comorbidities that might also contribute to increases in these behaviors.
- The data from this study provide insight into various medical and environmental factors that are associated with internalizing behaviors and can help create targeted interventions for children with ASD that takes these other factors into account.

Acknowledgements and References

- Oswald, T.M. et al. Sex Differences in Internalizing Problems During Adolescence in Autism Spectrum Disorder. J Autism Dev Disord 46, 624–636 (2016).

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