

Childhood Trauma’s Modifying Effect on Reward and Punishment Sensitivities’ Associations with Eating Disorder Symptoms

Presenter: Clara Xu: Department of Psychology; **Mentor:** Jessica Baker, PhD: Department of Psychiatry

Background

Eating Disorders (EDs)

- 53.3% of ED patients report childhood emotional abuse and 45.4% report childhood physical abuse⁴
- Those with childhood traumatic events (CTEs) twice as likely to report EDs in adulthood⁵
- Binge eating (BE) and restriction are positively correlated with reward sensitivity (RS)^{1,3}
- More orbitofrontal cortex (processes rewarding aspects of taste) activation for food in females with BE²
- Positive association between punishment sensitivity (PS) and dysfunctional eating behaviors⁶
- PS is positively correlated with BE and restriction^{7,5}

CTE

RS

PS

Because CTE, RS, and PS are predictors of ED symptoms such as BE and restriction, and there are associations between the predictors such that CTE is associated with higher PS⁸ and higher levels of reward functioning in adulthood⁹, different levels of CTE might modify RS and PS associations with BE and restriction

Hypothesis

The effects of RS and PS on BE and restriction are modified by the levels of CTEs. RS and PS’s associations with BE and restriction are stronger for individuals with multiple CTEs than for individuals without multiple CTEs.

Methods

Data Collection: Data were collected through a Qualtrics survey from the psychology subject pool.

Variable Operationalization

- RS and PS were measured by self-report through the Sensitivity to Punishment/Sensitivity to Reward Questionnaire (SPSRQ).
- BE and restriction were measured by self-report through the Eating Pathology Symptoms Inventory (EPSI).
- CTEs were measured by self-report through the Childhood Traumatic Event Scale (CTES). CTE was defined as a binary measure of two levels:
 - 0 = reported < 2 CTE, low CTE
 - 1 = reported \geq 2 CTE, high CTE

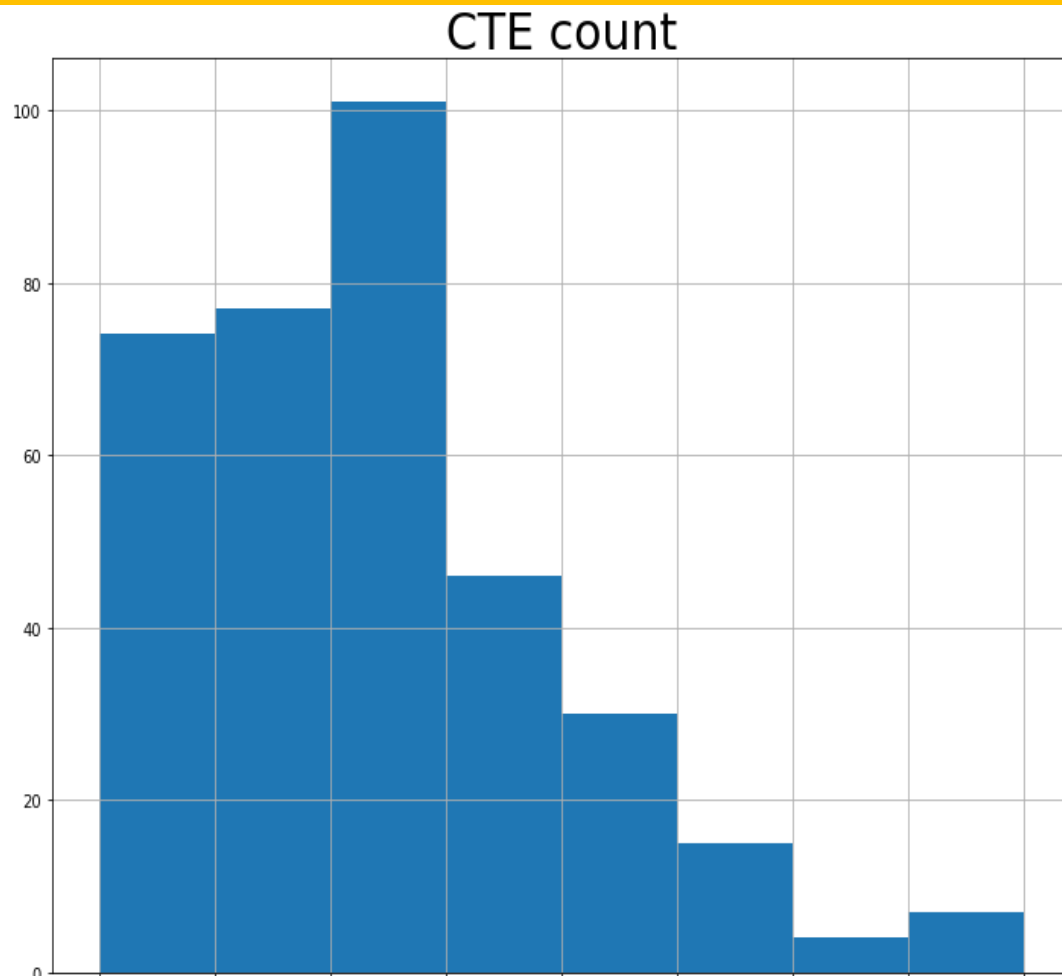
Analysis: Linear regression models stratified by CTE group status including covariates of age, BMI, year in school, race, ethnicity, Behavioral Activation System (BAS) and Behavioral Inhibition System (BIS).

- A separate regression was completed for BE and restriction as outcomes
- Separate regression were also completed for RS and PS as independent variables

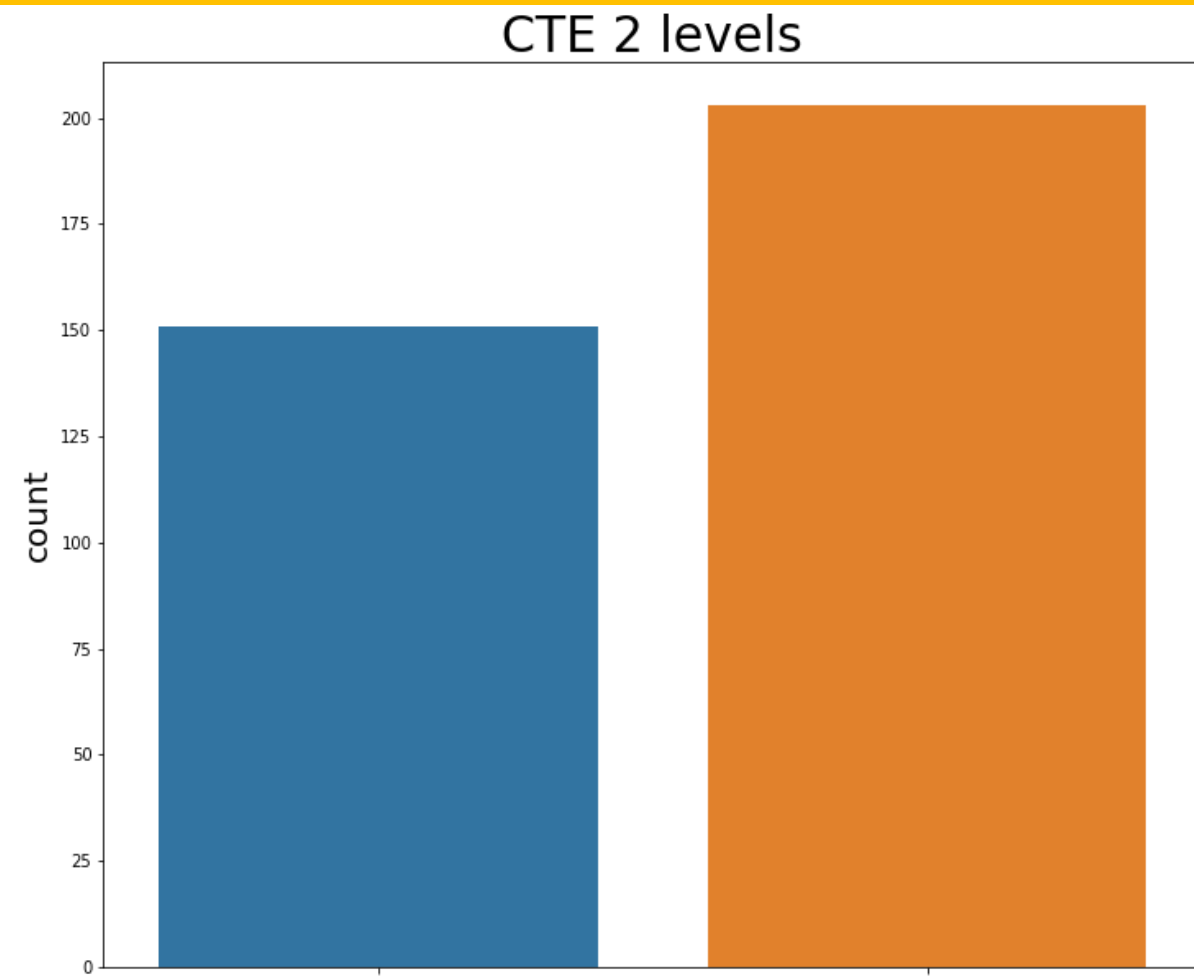
Participants

Participants (N=391) for this study are biological females older than 18 years old ($\mu = 18.67, \sigma = 4.32$). Only responses from participants who completed the study surveys are used in the analysis (N=354). Most participants are first-years college students (58.2%), Caucasian (68.9%), and non-Hispanic (92.1%) with BMI $\mu = 22.6, \sigma = 4.1$.

Descriptive Statistics

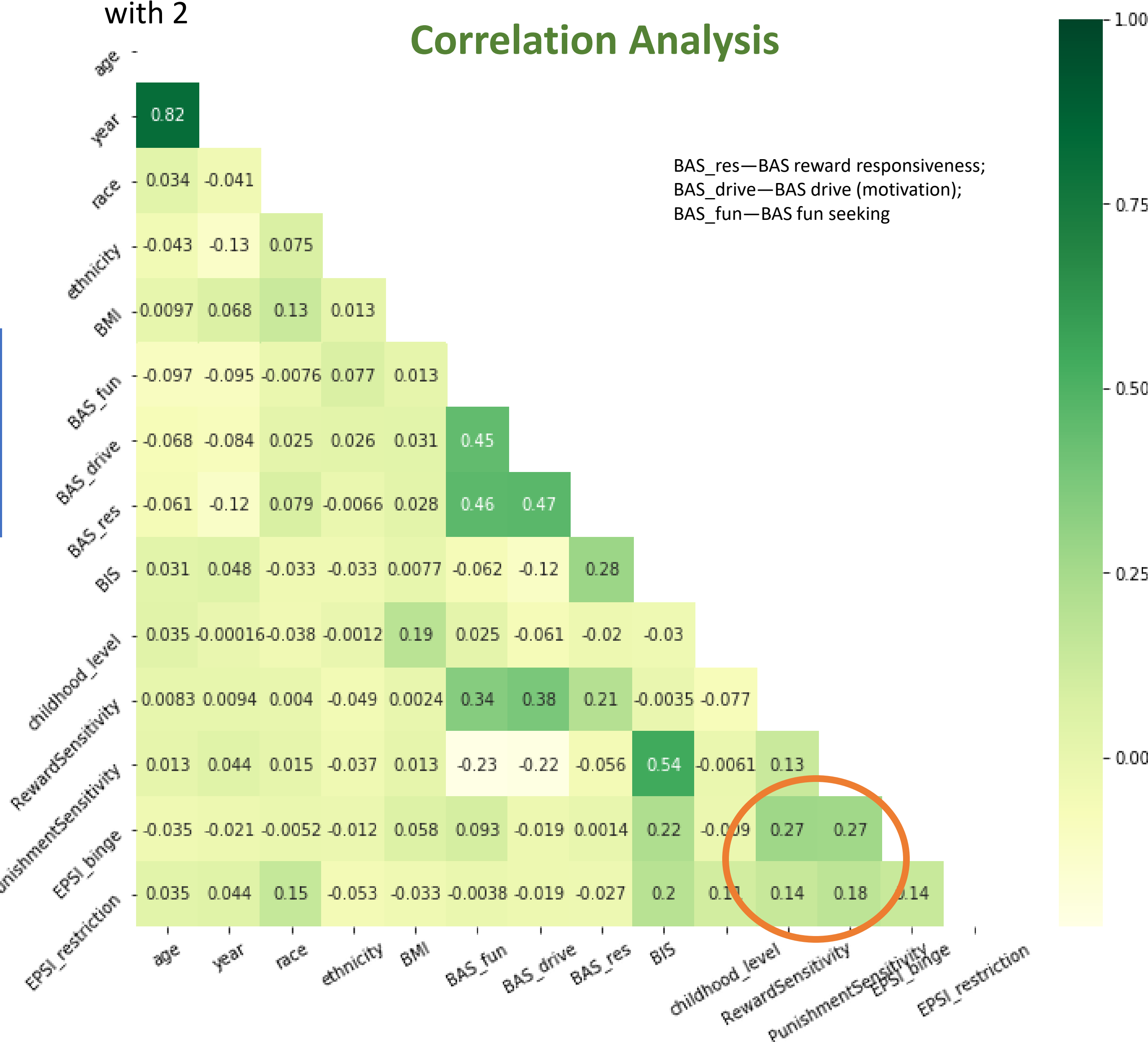


74 with 0 trauma, 77 with 1, 101 with 2



151 with < 2 CTE, 203 with \geq 2 CTEs

Correlation Analysis

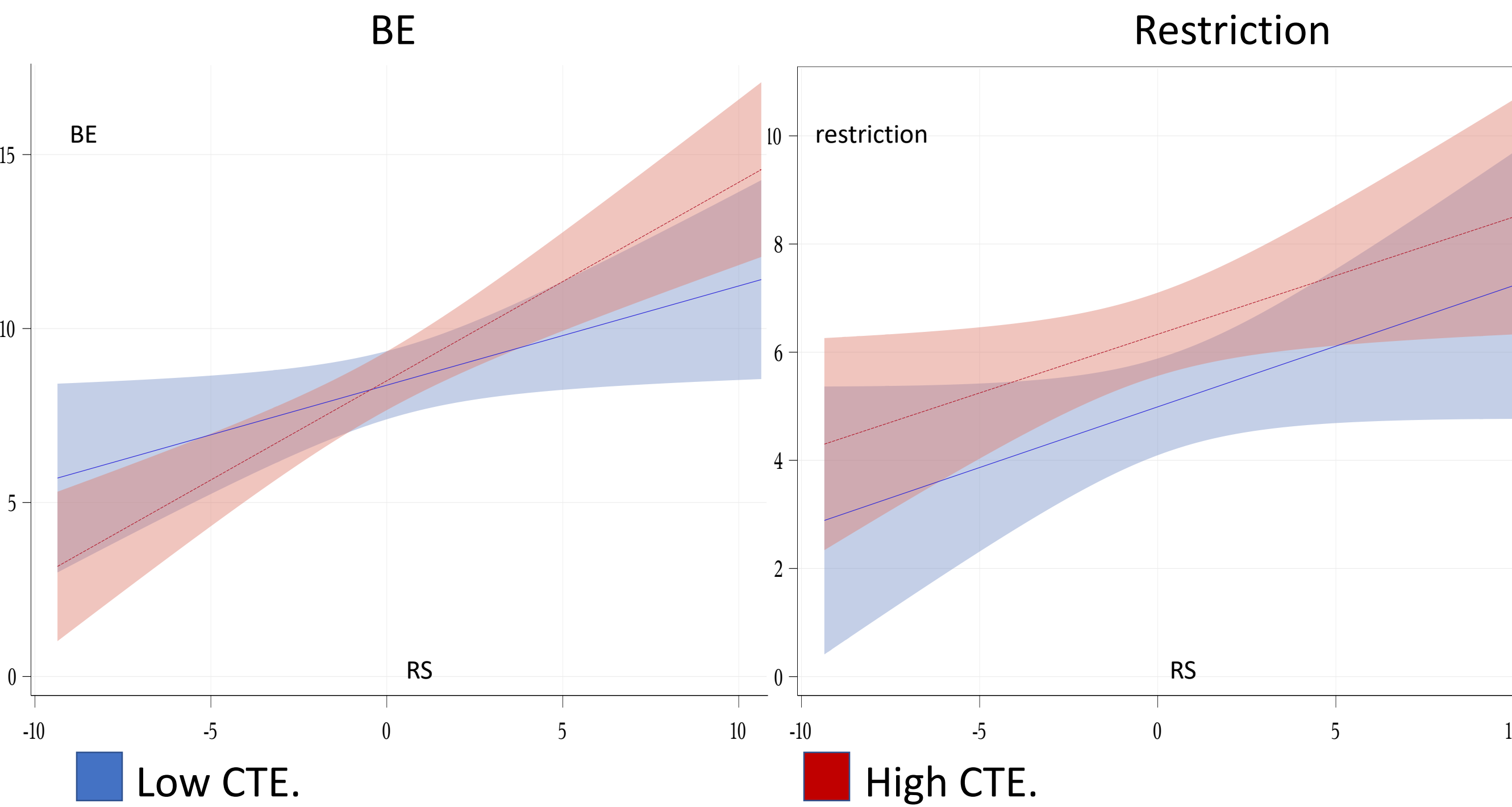


BAS_res—BAS reward responsiveness;
BAS_drive—BAS drive (motivation);
BAS_fun—BAS fun seeking

Restriction as the Dependent Variable

	N	r ²	IV	β	SE	t
high	203	0.073	RS results			
			RS	0.27	0.13	2.13
			BIS	0.43	0.15	2.86
low	151	0.079	Race	2.37	0.96	2.46
			RS	0.25	0.11	2.18
			Race	2.31	0.89	2.60
high	203	0.054	PS results			
			PS	0.20	0.09	2.17
			Race	2.23	0.89	2.50
low	151	0.050	PS	-0.03	0.10	-0.30
			BIS	0.48	0.17	2.78
			BAS reward	-0.49	0.28	-1.75
			Race	2.41	0.98	2.45

Preliminary plots of Interactions between RS and CTE



Conclusions

BE:

- CTE modifies the associations between RS and PS and BE.
- RS and PS and BE are associated only for those with high CTE.

Restriction:

- CTE only modifies the associations between PS and restriction.
- PS and restriction are associated only for those with high CTE.

Implications:

- CTEs may be used in conjunction with RS and PS to identify high risk population for certain eating disorder symptoms.
- Develop possible interventions targeting individuals with both high CTE and high RS and PS.

Limitations:

- Sequential time of events are assumed.
- Participants could have different definitions for CTE and the CTEs are self-reported.
- Behavioral measures of reward other than self-report might be helpful.
- If longitudinal data could be obtained, a mediation model with RS and PS as mediators carrying the effects of CTEs might fit better.

References

- Schienze, A., Schäfer, A., Hermann, A., & Vaitl, D. (2009). Binge-eating disorder: reward sensitivity and brain activation to images of food. *Biological psychiatry*, 65(8), 654-661.
- Pignatelli, A. M., Wampers, M., Lorieo, C., Biondi, M., & Vanderlinden, J. (2017). Childhood neglect in eating disorders: A systematic review and meta-analysis. *Journal of Trauma & Dissociation*, 18(1), 100-115.
- Rolls, E. T. (2000). The orbitofrontal cortex and reward. *Cerebral cortex*, 10(3), 284-294.
- Ahern, A. L., Field, M., Yokum, S., Bohon, C., & Stice, E. (2010). Relation of dietary restraint scores to cognitive biases and reward sensitivity. *Appetite*, 55(1), 61-68.
- Pignatelli, A. M., Wampers, M., Lorieo, C., Biondi, M., & Vanderlinden, J. (2017). Childhood neglect in eating disorders: A systematic review and meta-analysis. *Journal of Trauma & Dissociation*, 18(1), 100-115.
- Rayworth, B. B., Wise, L. A., & Harlow, B. L. (2004). Childhood abuse and risk of eating disorders in women. *Epidemiology*, 5(1), 6.
- Loxton, N. J., & Dawe, S. (2006). Reward and punishment sensitivity in dysfunctional eating and hazardous drinking women: Associations with family risk. *Appetite*, 47(3), 361-371.
- Eneva, K. T., Murray, S., O'Garro-Moore, J., Yiu, A., Alloy, L. B., Avena, N. M., & Chen, E. Y. (2017). Reward and punishment sensitivity and disordered eating behaviors in men and women. *Journal of eating disorders*, 5(1), 6.
- Miu, A. C., Blic, M. I., Bunea, I., & Szentágotai-Táti, A. (2017). Childhood trauma and sensitivity to reward and punishment: Implications for depressive and anxiety symptoms. *Personality and Individual Differences*, 119, 134-140.
- Egerton, A., Valmaggia, L. R., Howes, O. D., Day, F., Chaddock, C. A., Allen, P., ... & Lappin, J. M. (2016). Adversity in childhood linked to elevated striatal dopamine function in adulthood. *Schizophrenia research*, 176(2-3), 171-176.

Stratified Regressions

BE as the Dependent Variable

CTE	N	r ²	IV	β	SE	t
high	203	0.17	RS results			
			RS	0.68	0.13	5.40
			BIS	0.51	0.13	3.90
low	151	0.11	RS	0.22	0.14	1.63
			BIS	0.47	0.169	2.95
			BAS Fun	0.69	0.24	2.82
			BAS reward	-0.69	0.29	-2.40
			BMI	0.42	0.19	2.25
high	203	0.13	PS results			
			PS	0.39	0.11	3.58
			BAS Fun	0.46	0.23	2.02
low	151	0.10	PS	0.07	0.11	0.68
			BIS	0.43	0.18	2.39
			BAS Fun	0.76	0.24	3.15
			BAS reward	-0.70	0.29	-2.43
			BMI	0.45	0.19	2.43

The regression tables only include covariates with $p < 0.5$. The target predictors (RS and PS, shaded gray) are bolded and colored blue if they are significant.