[1] Psychopathy, borderline personality disorder, and emotional processing in incarcerated

[2] women

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Abstract

One or two sentences providing a **basic introduction** to the field, comprehensible to a scientist in any discipline. Two to three sentences of **more detailed background**, comprehensible to scientists in related disciplines. One sentence clearly stating the **general problem** being addressed by this particular study. One sentence summarizing the main result (with the words "**here we show**" or their equivalent). Two or three sentences explaining what the **main result** reveals in direct comparison to what was thought to be the case previously, or how the main result adds to previous knowledge. One or two sentences to put the results into a more **general context**. Two or three sentences to provide a **broader perspective**, readily comprehensible to a scientist in any discipline.

Keywords: keywords

Word count: X

27 Psychopathy, borderline personality disorder, and emotional processing in incarcerated

28 women

Introduction

Present Aims

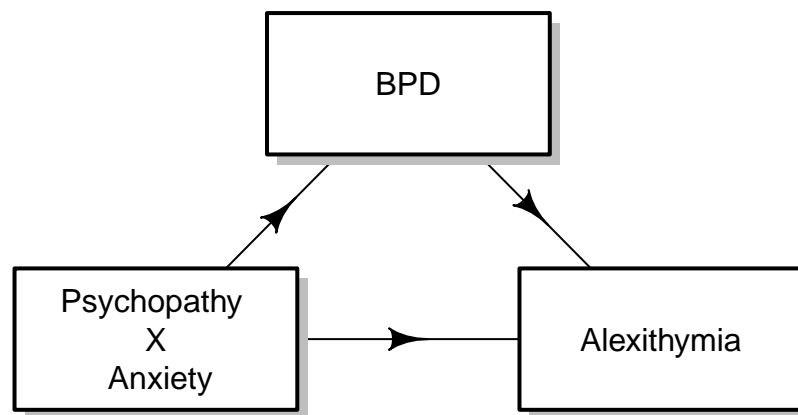*Figure 1*

(#fig:simple plot of mediation relationship)

Methods

32 We report how we determined our sample size, all data exclusions (if any), all

33 manipulations, and all measures in the study.

Participants

Measures

Procedure

Of the 156 total participants, 52 participants failed to complete one or more of the four assessments. Due to the nature of the variables, it was determined most ethical to simply remove participants who were missing data for any of the required assessments. A total of 104 participants remained for further analysis.

Data analysis

We used R (Version 4.3.2; R Core Team, 2023) and the R-packages *diagram* (Version 1.6.5; Soetaert, 2020), *dplyr* (Version 1.1.4; Wickham, François, Henry, Müller, & Vaughan, 2023), *forcats* (Version 1.0.0; Wickham, 2023a), *ggformula* (Version 0.12.0; Kaplan & Pruim, 2023), *ggplot2* (Version 3.4.4; Wickham, 2016), *ggsci* (Version 3.0.0; Xiao, 2023), *kableExtra* (Version 1.4.0; Zhu, 2024), *lattice* (Version 0.21.9; Sarkar, 2008), *lubridate* (Version 1.9.3; Grolemund & Wickham, 2011), *MASS* (Version 7.3.60; Venables & Ripley, 2002), *Matrix* (Version 1.6.1.1; Bates, Maechler, & Jagan, 2023), *mediation* (Imai, Keele, & Tingley, 2010; Imai, Keele, Tingley, & Yamamoto, 2011; Imai, Keele, & Yamamoto, 2010; Imai & Yamamoto, 2013; Version 4.5.0; Tingley, Yamamoto, Hirose, Keele, & Imai, 2014), *mosaic* (Version 1.9.0; Pruim, Kaplan, & Horton, 2017; Pruim, Kaplan, & Horton, 2023), *mosaicData* (Version 0.20.4; Pruim et al., 2023), *mvtnorm* (Version 1.2.4; Genz & Bretz, 2009), *papaja* (Version 0.1.2; Aust & Barth, 2023), *plot.matrix* (Version 1.6.2; Klinke, 2022), *psych* (Version 2.4.1; William Revelle, 2024), *purrr* (Version 1.0.2; Wickham & Henry, 2023), *readr* (Version 2.1.4; Wickham, Hester, & Bryan, 2023), *readxl* (Version 1.4.3; Wickham & Bryan, 2023), *sandwich* (Zeileis, 2004, 2006; Version 3.1.0; Zeileis, Köll, & Graham, 2020), *shape* (Version 1.4.6; Soetaert, 2021), *stargazer* (Version 5.2.3; Hlavac,

58 2022), *stringr* (Version 1.5.1; Wickham, 2023b), *tibble* (Version 3.2.1; Müller & Wickham,

59 2023), *tidyr* (Version 1.3.0; Wickham, Vaughan, & Girlich, 2023), *tidyverse* (Version 2.0.0;

60 Wickham et al., 2019), and *tinylabels* (Version 0.2.4; Barth, 2023) for all our analyses.

Results

Table 1

Summary Table

Statistic	N	Mean	St. Dev.	Min	Max
PAIBOR_Total_Score	104	36.750	11.738	11	58
PCLR_Total_Score_Prorated	104	23.476	8.070	4.400	37.000
TAS_Total_Score	104	49.702	13.852	20	82
STAI_Trait_Anxiety	104	45.558	11.213	23	72

62 Descriptive statistics for the assessments of interest can be seen in Table 1.

63 ## Warning: Removed 2 rows containing missing values ('geom_bar()').

64 As seen in Figure 2, our distribution of PCL–R scores is left-skewed, with more

65 participants falling on the higher end of the spectrum. This is ?consistent? with past

66 studies conducted with incarcerated populations (probably Decety). Other score

67 assessment distributions can be found in the appendix.

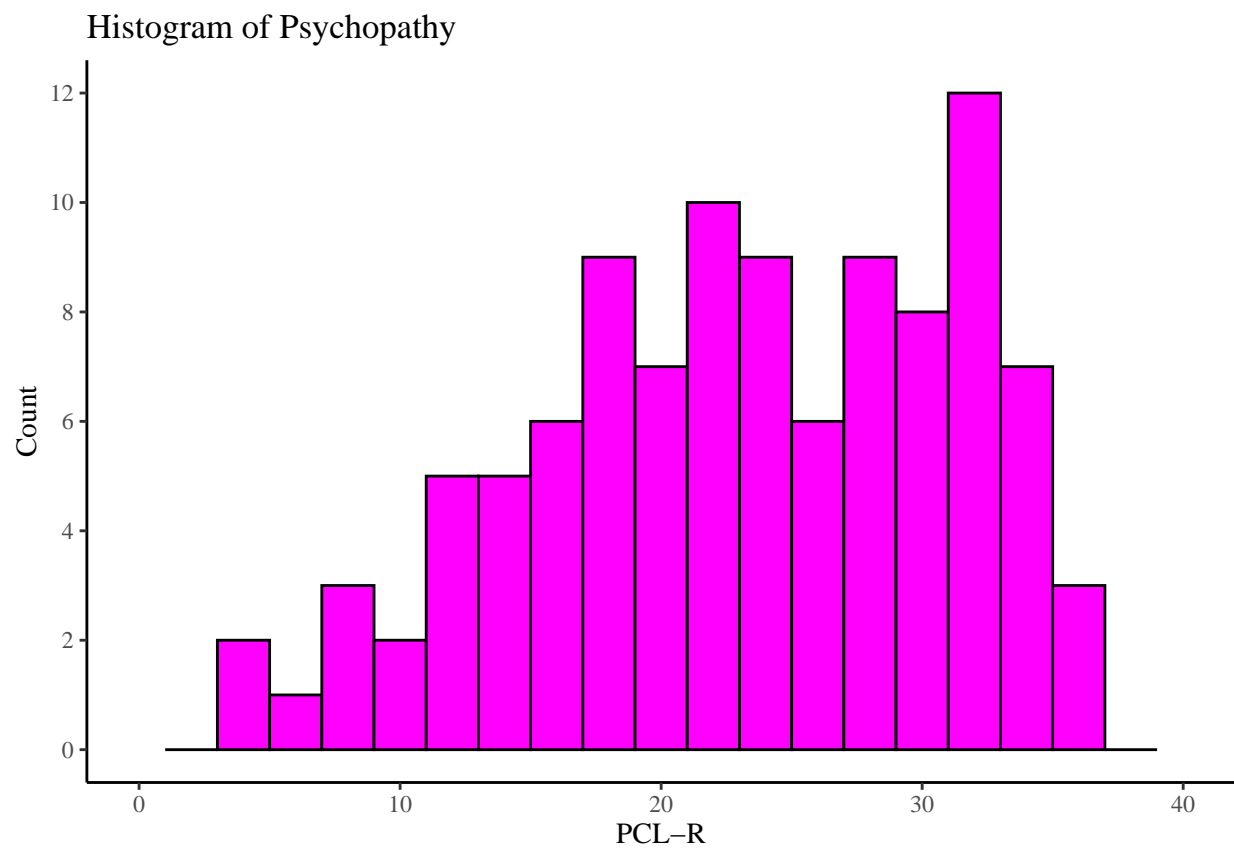68 ## Warning: Removed 2 rows containing missing values ('geom_bar()').

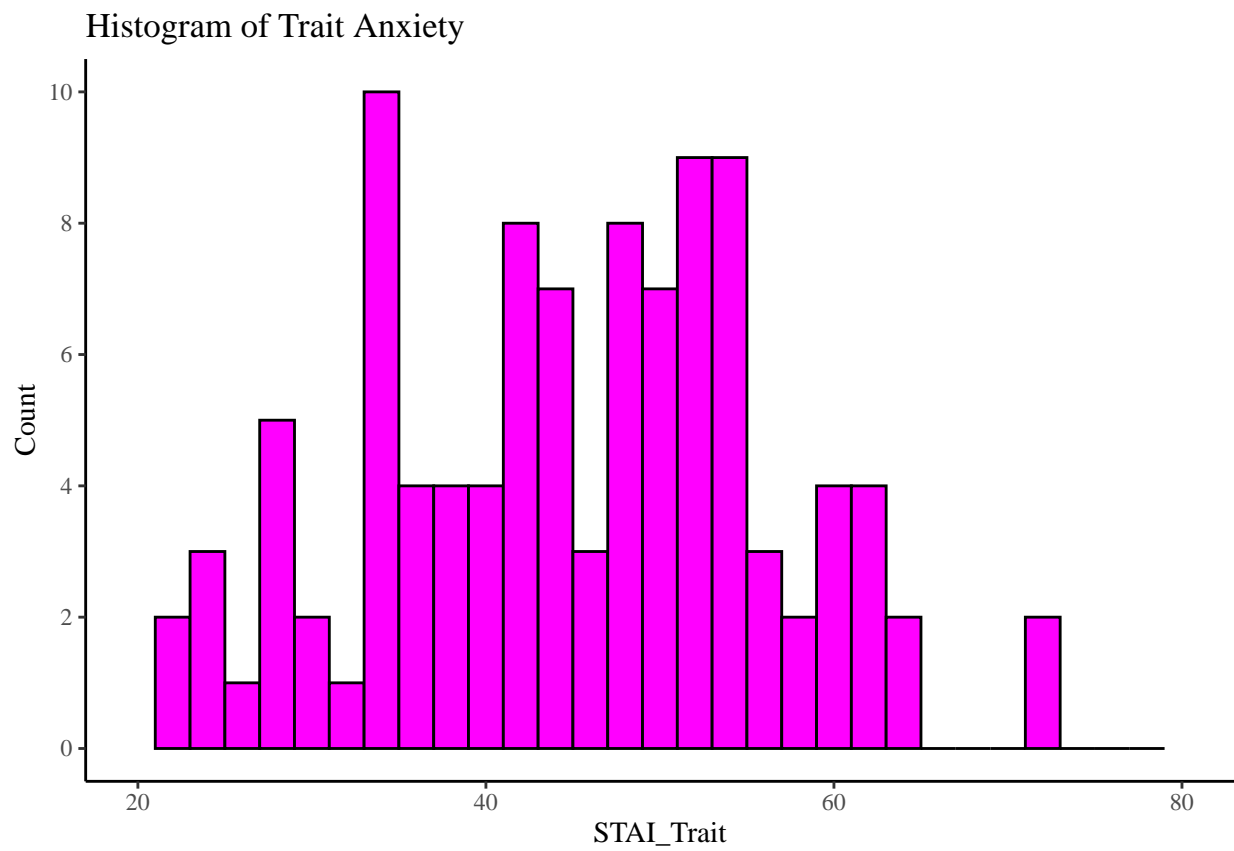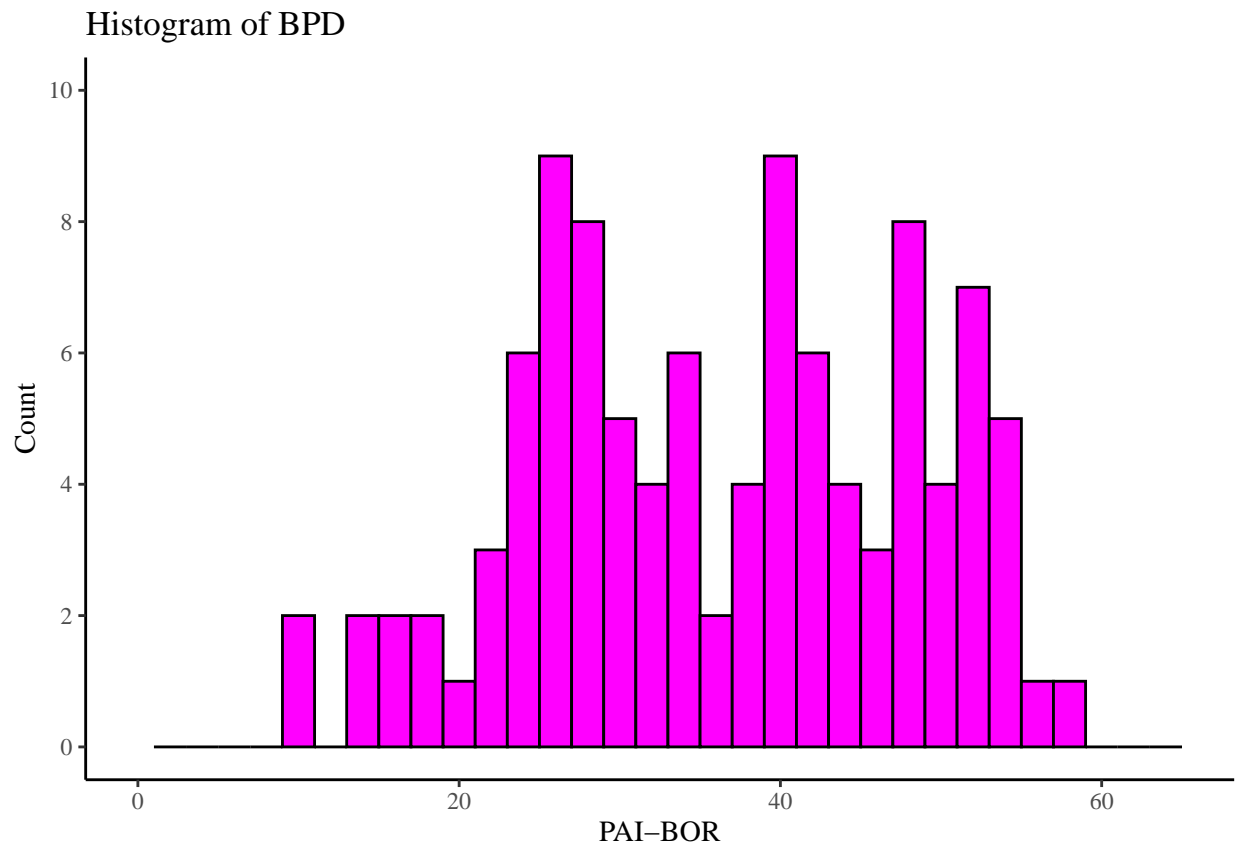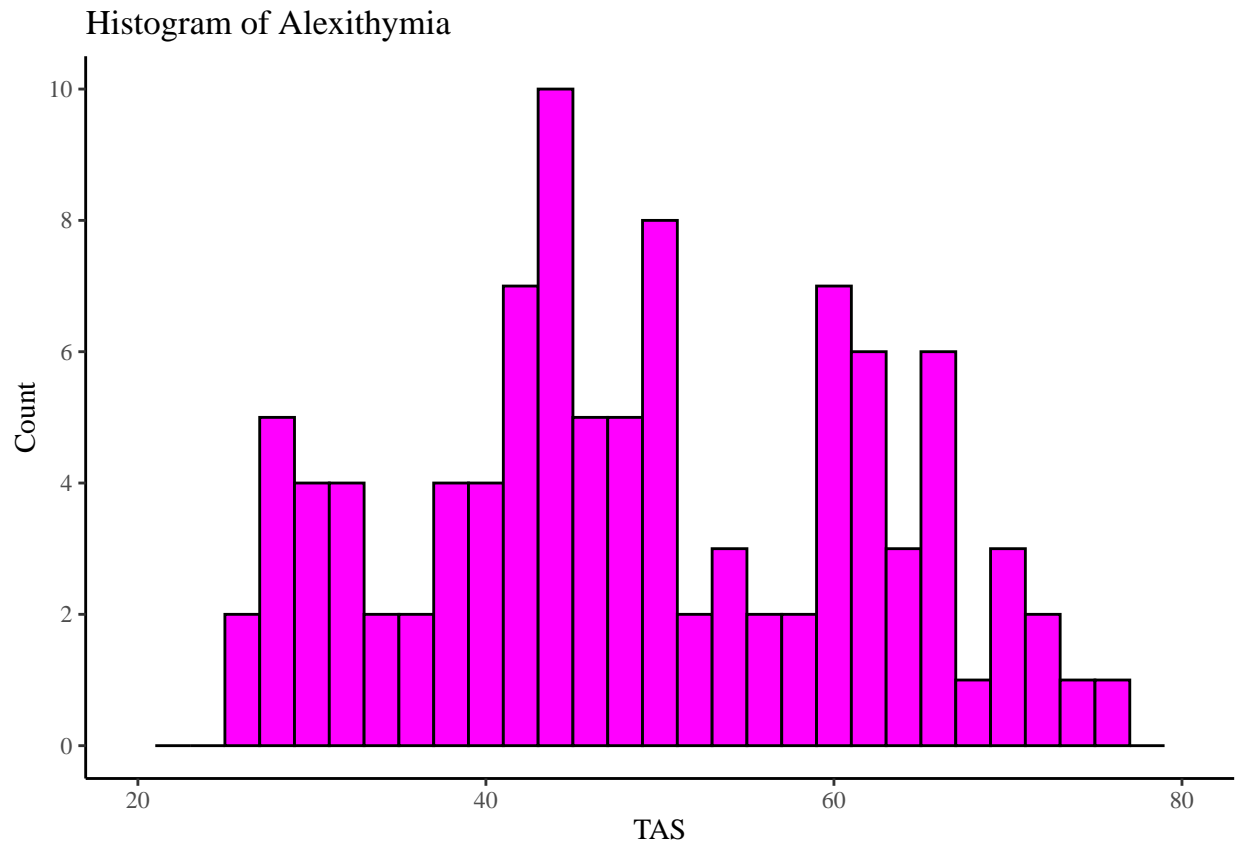*Figure 2.* Histogram of score distribution on the PCL–R.

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Histogram of BPD

71

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73 ## Warning: Removed 2 rows containing missing values ('geom_bar()').

Histogram of Alexithymia

The mean PCL–R score is 23.48.

The mean PAI–BOR score is 36.75.

The mean TAS score is 49.70.

Figure 3 shows a moderate correlation of 0.37 between PsychopathyXAnxiety and Alexithymia. . . .

Figure 4 shows a moderate to strong correlation of 0.66 between PsychopathyXAnxiety and BPD. . . .

All assessment scores (including the interactive term) were standardized. Mediation analyses with bootstrapping were conducted to test the primary hypothesis. Unlike other methods, bootstrapping is not limited by the assumption of normality. The interaction term of PCL–R Total Score and STAI Trait Anxiety was entered as the predictor, and PAI-BOR Total Score was entered as the mediating term. Total Score on the TAS was our
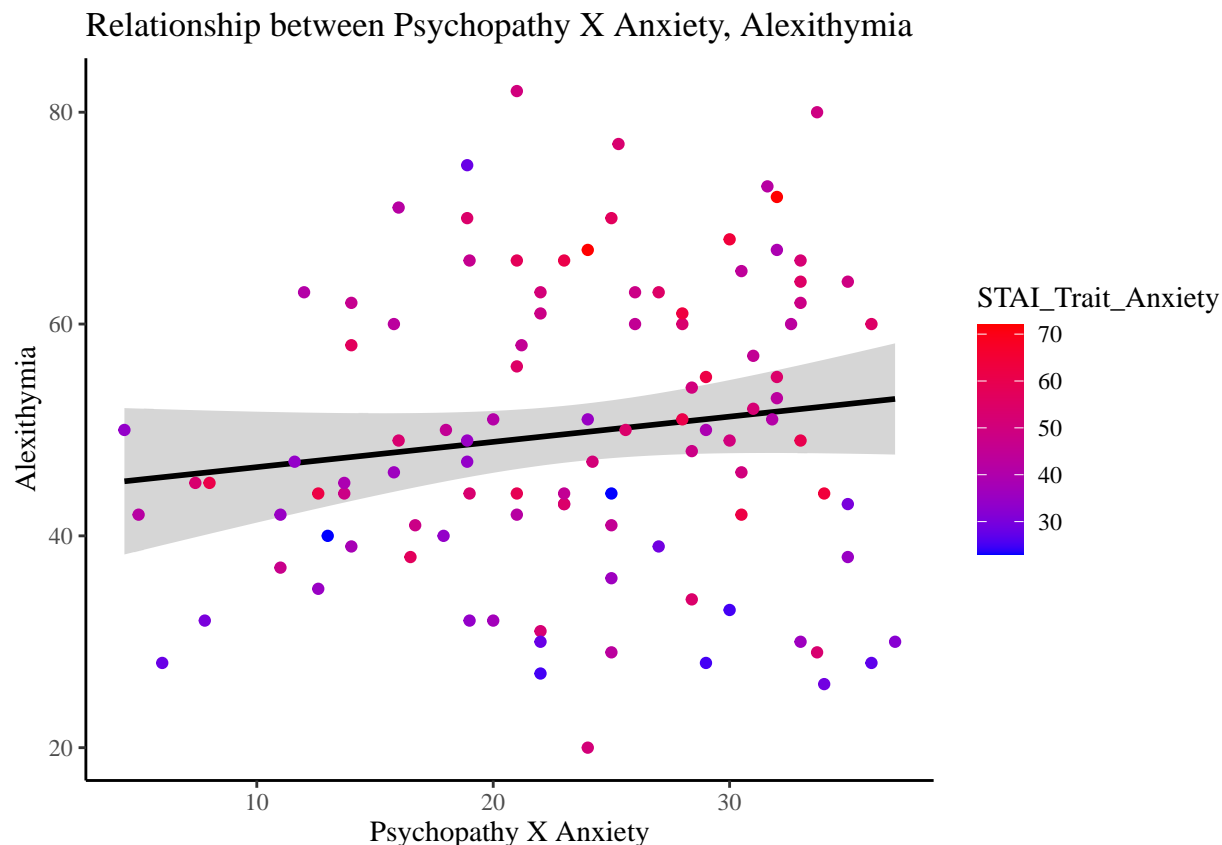
Figure 3. Scatterplot demonstrating relationship between the interactive term of psychopathy and trait anxiety with alexithymia in our sample of incarcerated women.

87   outcome variable. A significant Average Causal Mediation Effect (ACME) would

88   demonstrate support of our hypothesis. Summary tables (figure out how to include this

89   info) show that the ACME is significant and the Average Direct Effect (ADE) disappears.

90   This implies full causal mediation by BPD on the relationship between

91   PsychopathyXAnxiety and Alexithymia.

92   In order to run a mediation analysis, one must ensure significant relationships exist

93   between predictor and outcome, predictor and mediator, and mediator and outcome.

94   Results for these preliminary analyses can be seen in Table 2.

95   There is a significant relationship between predictor and outcome ($p =$). However,

96   this effect goes away when adding BPD as a mediator ($p =$). This suggests that the

Table 2

Preliminary Regression Results

	Dependent variable:		
	P-O Path	P-M Path	M-O Path
	(1)	(2)	(3)
PsychopathyXAnxiety	0.373***	0.660***	
	(0.092)	(0.074)	
BPD			0.471***
			(0.087)
Constant	−0.000	−0.000	−0.000
	(0.091)	(0.074)	(0.087)
Observations	104	104	104
R^2	0.139	0.436	0.222
Adjusted R^2	0.131	0.431	0.214
Residual Std. Error (df = 102)	0.932	0.755	0.887
F Statistic (df = 1; 102)	16.501***	78.905***	29.024***
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 3

Simple Linear Regression Results

	Dependent variable:			
	TAS Total	Factor 1	Factor 2	Factor 3
	(1)	(2)	(3)	(4)
PsychopathyXAnxiety	0.373***	0.418***	0.291***	0.197**
	(0.092)	(0.090)	(0.095)	(0.097)
Constant	−0.000	−0.000	−0.000	0.000
	(0.091)	(0.090)	(0.094)	(0.097)
Observations	104	104	104	104
R^2	0.139	0.174	0.085	0.039
Adjusted R^2	0.131	0.166	0.076	0.030
Residual Std. Error (df = 102)	0.932	0.913	0.961	0.985
F Statistic (df = 1; 102)	16.501***	21.551***	9.463***	4.140**

Note: *p<0.1; **p<0.05; ***p<0.01

Table 4

Multiple Linear Regression Results

	Dependent variable:			
	TAS Total	Factor 1	Factor 2	Factor 3
	(1)	(2)	(3)	(4)
PsychopathyXAnxiety	0.111	0.096	0.036	0.154
	(0.116)	(0.110)	(0.121)	(0.130)
BPD	0.398***	0.487***	0.386***	0.066
	(0.116)	(0.110)	(0.121)	(0.130)
Constant	−0.000	−0.000	−0.000	0.000
	(0.087)	(0.082)	(0.090)	(0.097)
Observations	104	104	104	104
R^2	0.228	0.308	0.169	0.041
Adjusted R^2	0.213	0.294	0.153	0.022
Residual Std. Error (df = 101)	0.887	0.840	0.921	0.989
F Statistic (df = 2; 101)	14.949***	22.477***	10.273***	2.182

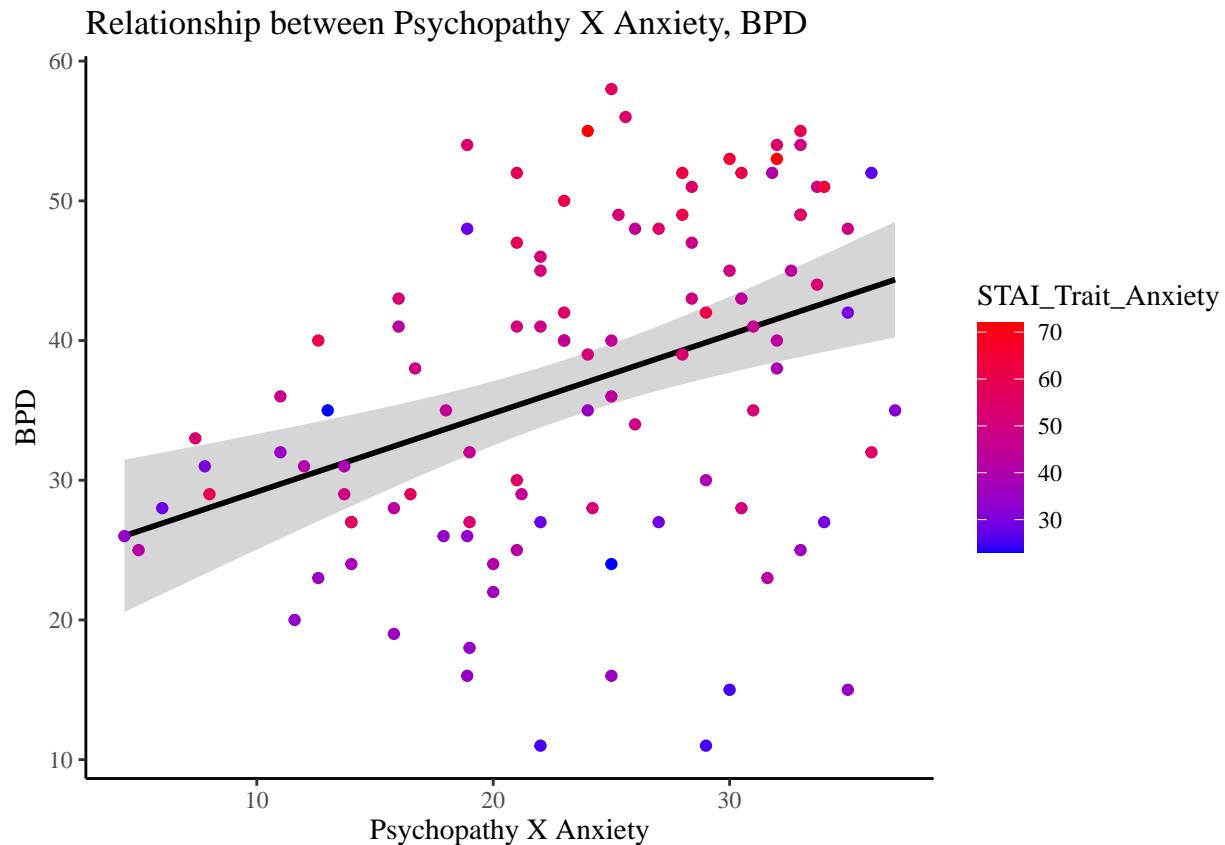| *Note:*	*p<0.1; **p<0.05; ***p<0.01

Figure 4. Scatterplot demonstrating relationship between the interactive term of psychopathy and trait anxiety with borderline personality disorder in our sample of incarcerated women.

presence of BPD acts as a mechanism through which the predictor influences the outcome. The significant, full mediation effect we observed suggests that a portion of the total effect of the predictor on the outcome is explained by the mediator ($p =$).

Three subfactors defined in the TAS are believed to compose alexithymia: difficulty identifying feelings (Factor 1), difficulty describing feelings (Factor 2), and externally-oriented thinking (Factor 3). As we collected subfactor scores for every participant, an exploratory analysis could be conducted to get a sense of what specific parts of emotional processing psychopathy and BPD may be impacting. We found that, replacing the total TAS score for Factor 1 and Factor 2, the significant mediation effect

remained in tact. However, designating Factor 3 as an outcome left us with an insignificant model. The change in significant effect when replacing for specific factors of TAS suggests the mediation effect may depend on specific aspects or dimensions of alexithymia. It is critical these results are analyzed with caution as no hypotheses regarding TAS subfactors were determined a priori and the theoretical lineage is at present quite limited.

Discussion

It is possible that BPD symptoms uniquely impact certain dimensions of the outcome variable. When considering what each of the three factors represent, it may be plausible that BPD would affect factors 1 and 2 – addressing emotional comprehension and recognition – and not 3, as BPD may be more closely associated with internalizing features. More research that addresses the role of BPD on externally-oriented thinking is required here to draw firmer conclusions.

It is without a doubt that the relationship between psychopathy, anxiety, BPD, and alexithymia is multifaceted and complex. Our results should be further interpreted with caution and a unique sample such as this one may lead to skewed distributions.

Additional factors and moderators warrant further exploration. Other relevant comorbidities – such as PTSD – may influence the heterogeneous mediation pathway seen here in a way that could explain the nuanced relationships further. Further, it would certainly be worthwhile to break down BPD further to understand what specific mechanisms of this disorder might be at play in this relationship. We did not have sufficient data to conduct a factor analysis, but it may be useful as the personality disorder can be diagnosed in 256 unique ways, according to the DSM-V.

The heterogeneity of this mediation effect is certainly cause for future research. This information can guide the development of targeted interventions or strategies based on specific factors that are most influenced by the mediation process. This changes in

131 significance emphasize the need for careful and nuanced interpretation, taking into account

132 the specific characteristics and dynamics at play for each factor within the composite

133 variables.

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