Perfectionism and Past Trauma: Predictors of Eating Disorder Risk in College Students

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Background

Eating disorders are serious and multifaceted mental health conditions that disrupt eating behavior, leading to significant physical, psychological, and social impairment.

30,000,000 Americans will experience eating disorders (9% of population)

1 death every

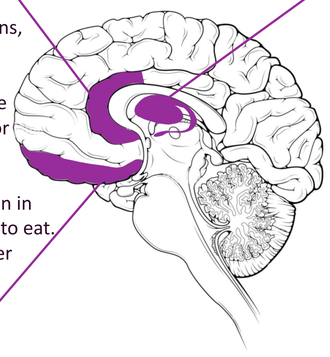
10,200 death = 52 min

(Eating Recovery Center)

	AN Anorexia Nervosa	BN Bulimia Nervosa	BED Binge Eating Disorder	ARFID Avoidant-Restrictive Food Intake Disorder	Pica	Rumination-Regulation Disorder
Restraint	●●●	●○○	○○○	●●●	Eat non-food items. Kid with Pica (PIE-kuh)	Repeatedly regurgitates undigested or partially digested food from the stomach
Purging	●●●	●●●	○○○	Eat an extremely limited variety of preferred foods.		
Overeating	○○○	●●●	●●●			

Eating disorders can impact the brain through a limited or excessive diet and associated changes in chemical balance. One of the common ways AN impacts the brain is through a limited diet, leading to insufficient nutrients, vitamins, and minerals, causing **cognitive impairments** such as confusion, **difficulty concentrating**, or **problems with working memory**. A lack of glucose can be problematic as well. The human body and brain require a sufficient energy source to perform normal functions, and without energy, impairments in motor functions, attention span, and memory can occur.

Anterior Cingulate Cortex :
Play an important role in **inhibitory** cognitive functions, emotional regulation, and decision-making skills.
The dorsal ACC can separate **food responses** into liking or wanting through visual and auditory cues.
Dysfunctional activity is seen in AN, causing intense refusal to eat.
AN has 5.4% less gray matter volume in the ACC compared to healthy subjects.



Striatum :
Receive information on gastric distension and self-reported **feelings of fullness**.
AN showed higher sensitivity associated with emotional stimuli and rewards compared to the healthy group.
AN also showed higher activation levels when responding to negative factors such as punishment and losses than positive elements.
These findings support the reason why people with AN are particularly sensitive to criticism and failure.

Orbitofrontal cortex :
Determines the **reward value of food** and the feeling of fullness. Damage to the orbitofrontal cortex impairs learning ability including taste, face, and reward-punishment related behavior.
BED showed significant impulsivity.
AN and BN showed a larger volume of the orbitofrontal gyrus rectus compared to the healthy group.
A large orbitofrontal cortex may suggest that stronger stimuli associated with food can drive food intake or avoidance.

Analysis

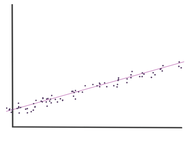
Simple Linear Regression

$$y = mx + c$$

y=predicted values of y
m=slope coefficient
c= y-intercept

$$m = \frac{\sum_{i=1}^{n} x_i y_i - \frac{1}{n}\sum_{i=1}^{n} x_i \sum_{i=1}^{n} y_i}{\sum_{i=1}^{n} x_i^2 - \frac{1}{n}\left(\sum_{i=1}^{n} x_i\right)^2}$$

$$c = \frac{1}{n}\sum_{i=1}^{n}(y_i - mx_i)$$



Simple linear regression:
1 Dependent Variable and **1** Independent Variable produce a line in a graph

Multiple Linear Regression

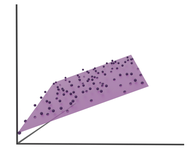
$$\begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_d \end{bmatrix} = \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_d \end{bmatrix} \cdot \begin{bmatrix} x_{11} x_{12} \cdots x_{1n} \\ x_{21} x_{22} \cdots x_{2n} \\ \vdots \quad \vdots \quad \ddots \quad \vdots \\ x_{d1} x_{d2} \cdots x_{dn} \end{bmatrix} + \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_d \end{bmatrix}$$

Out(DV) In(IV)

Y= Predicted values of y
w=weight coefficient (slope)
ε= error term (y-intercept)

$$Y = w_0 + w_1 X_1 + w_2 X_2 + \cdots + w_d X_d + \varepsilon$$

Obtain minimum w and high prediction rate(R^2)



Multiple linear regression:
1 Dependent Variable and **2** Independent Variables produce a plane in a graph

Results

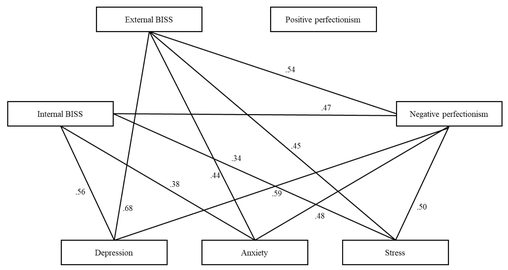
<0.01	*BISS*		*PANPS*		*DASS*			*ACE-Q*
<0.001	External	Internal	Positive	Negative	Depression	Anxiety	Stress	1~10
GlobalED	0.616	0.601	0.254	0.442	0.584	0.416	0.449	N/A
Restraint	0.389	0.366	0.23	0.194	0.409	0.271	0.316	N/A
EatingConcern	0.551	0.497	0.167	0.432	0.648	0.469	0.601	N/A
ShapeConcern	0.667	0.67	0.225	0.521	0.56	0.404	0.404	N/A
WeightConcern	0.592	0.6	0.272	0.436	0.506	0.369	0.341	N/A
Binge eating	0.477	0.37	0.064	0.179	0.466	0.207	0.338	N/A
Loss of control	0.341	0.287	0.15	0.298	0.294	0.137	0.216	N/A
Binge eating + loss of control	0.478	0.333	0.048	0.214	0.475	0.308	0.36	N/A
Self-induced vomiting	-0.07	-0.119	-0.041	0.051	0.167	-0.045	0.288	N/A
Laxative misuse	0.186	0.166	0.071	0.181	0.224	0.02	0.236	N/A
Excessive Exercise	0.162	0.227	0.161	0.157	0.241	0.163	0.268	N/A

Pearson's correlations were conducted between the EDE-Q and the BISS, PANPS, DASS, and ACE-Q. Colored cells indicate statistically significant differences. **External BISS showed a stronger correlation** with eating disorder traits compared to Internal BISS, although both were significantly associated. **Negative perfectionism demonstrated a strong correlation** with eating disorder traits, while positive perfectionism did not show significant associations. **Depression exhibited the highest correlation** with the EDE-Q. Across the analysis, none of the scales showed a significant correlation with bulimic behaviors. Additionally, the **ACE-Q did not show any significant correlation** with any EDE-Q subscale.

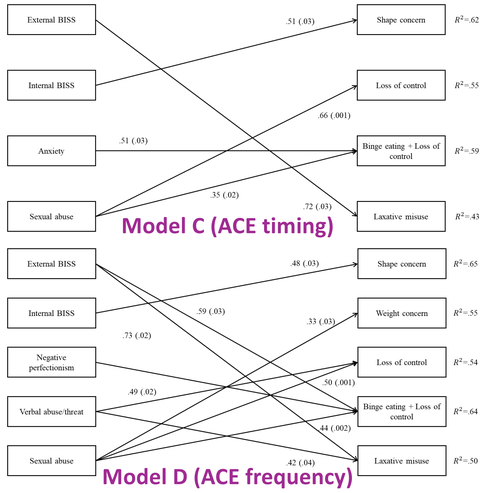
	R^2 A	B	C	D
Subscale				
Global Score	0.48	0.57	0.55	0.59
Restraint	0.33	0.44	0.42	0.47
Eating Concern	0.46	0.59	0.58	0.59
Shape Concern	0.54	0.66	0.62	0.65
Weight Concern	0.41	0.52	0.48	0.55
Behavior				
Binge eating	0.31	0.43	0.45	0.43
Loss of control	0.15	0.49	0.55	0.54
Binge eating + loss of control	0.35	0.64	0.59	0.64
Self-induced vomiting	0.35	-	-	-
Laxative misuse	0.23	0.45	0.43	0.50
Excessive Exercise	0.12	0.30	0.30	0.23
Mean	0.34	0.51	0.50	0.52
Standard deviation	0.126	0.105	0.095	0.119

The multiple linear regression produced R-squared change values, indicating the proportion of the total variance explained by the model when each variable group is added. These values reflect the incremental contribution of each predictor set to the overall explanatory power of the model.
Incorporating the ACE-Q increased the prediction rate by approximately 15%. Models that included the frequency of ACEs scored with slightly higher accuracy than those based on the timing of ACEs. Among all categories, shape concern and binge eating with loss of control accounted for approximately 65% of the prediction.

Model A: EDE-Q vs. BISS, PANPS, DASS
Model B-D: EDE-Q vs. BISS, PANPS, DASS, ACE-Q
Binary (**B**) | Timing (**C**) | Frequency (**D**)



A path analysis between BISS, PANPS, and DASS was conducted based on **Pearson's correlational** results. All scales, except for positive perfectionism, showed direct correlations. **Depression demonstrated the strongest associations** with both BISS and negative perfectionism. These findings highlight the interconnectedness of emotional distress, body image self-consciousness, and perfectionism. In contrast, **positive perfectionism may not contribute significantly** to emotional distress or body image concerns.



A path analysis was conducted **using multiple linear regression** for each model. The boxes on the left represent predictors, while the box on the right indicates the target variable. Arrows illustrate the magnitude of the regression weights, and significant coefficients are displayed in this figure. Using the **frequency of ACEs resulted in a more complex** and detailed model of the pathways. This suggests that **ACE frequency can enhance the depth of ana**lysis and help uncover minor contributing factors that may remain hidden in simpler models.

Questionnaire Contents

***Note**: All answers were collected within 28 days. (n=77)*

1. Eating Disorder Examination Questionnaire
(EDE-Q 6.0 | 28 items | 7-point scale)
Assesses the frequency of disordered eating cognitions and behaviors. Results are categorized into five subscales and additional behavioral measures:
Subscales: Restraint, Eating, Weight, Shape Concern, Global Score
Behavioral Measures: Binge eating, purging, and excessive exercise

2. Body Image Shame Scale
(BISS | 14 items | 7-point scale)
Measures the level of shame individuals experience when viewing their body either in a mirror or through mental imagery, without assigning numerical body size values.
Results are classified into two dimensions:
External BISS: Negative perceptions based on fear of judgment by others
Internal BISS: Personal negative feelings toward one's own body

3. Adverse Childhood Experience Questionnaire
(ACE-Q | 10 items | 7-point scale)
Originally a binary questionnaire indicating whether adverse experiences occurred within the first 18 years of life. This study expanded the measured responses to a 7-point scale. To address limitations in prior research, applying **frequency** and **timing** of experiences.

4. Positive and Negative Perfectionism Scale
(PANPS-SF | 20 items | 5-point scale)
Evaluates individual levels of perfectionism:
Positive Perfectionism: Reflects high personal standards and goal pursuit
Negative Perfectionism: Reflects avoidance-based behaviors and feelings of inadequacy or low self-worth in social comparisons

5. Depression, Anxiety, and Stress Scale
(DASS-21 | 21 items | 4-point scale)
Each psychological state is assessed through 7 items

Highlights

- BISS demonstrated a significant association with EDE-Q scores (External > Internal)
- **Perfectionism traits** influence ED development. Perfectionism also has direct correlations with other predictors. (Negative >> Positive)
- Emotional factors exhibit different correlation patterns with ED traits (Depression > Stress > Anxiety)
- Although **ACE showed a weak individual association** with ED traits, **its inclusion increased the predictive power** of the multiple regression model when all variables were combined. ACE is indirectly associated with eating disorders.

Limitation

Self-Selection Bias
Evaluation criteria vary among participants, making it difficult to apply a consistent scoring system.
Survey Fatigue
The survey was particularly long and repetitive, which may have led participants to drop out or lose focus.
Misinterpretation of Questions
Participants may interpret the same question in different ways, affecting the accuracy of the results.

Insufficient data population