Integrated Multimodal Brain Signatures Predict Sex-Specific Obesity

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Methods

183 participants (Female=118; Male=65; Obese=78; Non-obese=105) underwent multimodal MRI scans.

DIABLO was conducted on training and test sets to determine whether clinical features, resting-state functional connectivity, anatomical connectivity and brain morphometry could accurately differentiate participants stratified by obesity and sex.

<table>
<thead>
<tr>
<th></th>
<th>Non-obese</th>
<th>Obese</th>
<th>Total</th>
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<tbody>
<tr>
<td>Male</td>
<td>42</td>
<td>23</td>
<td>65</td>
</tr>
<tr>
<td>Female</td>
<td>63</td>
<td>55</td>
<td>118</td>
</tr>
<tr>
<td>Total</td>
<td>195</td>
<td>78</td>
<td>183</td>
</tr>
</tbody>
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Introduction

- Studies in obesity have individually used structural MR, functional resting state and diffusion tensor imaging to uncover mechanisms causing altered ingestive behaviors.
- Few have integrated data from multimodal brain imaging to predict sex-specific brain signatures.
- Aim: To investigate if a multimodal MR-clinical signature could predict people with obesity, dependent on sex-related differences.

Results

**Model 1:** Accuracy=74%, Kappa=46%, BER=26%

**Model 2:** Accuracy=74%, Kappa=40%, BER=32%

Discussion

Indicate that differences in morphometry and anatomical connectivity within the default mode network, and resting-state functional connectivity between the default mode network and orbital gyrus are able to distinguish people with obesity.

Inability to handle large cognitive loads could lead to lowered cognitive restraint and anxiety causing overeating behaviors seen in obese individuals.

Females with obesity had greater mean curvature in the postcentral gyrus and lateral temporal cortex and greater RSFC from the cerebellum to the SMN which were associated with greater likelihood of early life trauma and depression.

References


