Through Oxytocin and the Brain–Gut Axis Supportive Marriages may Shape Appetite Control

A group of researchers examined how marital status and perceived emotional support relate to obesity-related outcomes and to coordinated changes in oxytocin, brain responses to food cues, and gut tryptophan metabolites.

Study

Adults from the community (N=94) were enrolled with Institutional Review Board approval and informed consent. Exclusions covered major medical, neurological, or psychiatric illness, substance use disorders, medications affecting the central nervous system, pregnancy or breastfeeding, extreme training, and Magnetic Resonance Imaging (MRI) contraindications.

Marital status (married vs unmarried) was self-reported. Perceived emotional support (PES) used two Brief Coping Orientation to Problems Experienced (COPE) emotional-support items, each scored 1–4 (total 2–8). A median split (≥6 vs <6) defined "high" vs "low" support, creating four groups.

Outcomes included BMI, food-addiction symptoms, and perceived stress; covariates were age, sex, and race or ethnicity. Most participants were overweight or obese, which may limit generalisability to leaner populations.

Functional magnetic resonance imaging (fMRI) on a 3.0-T scanner assessed food-cue reactivity using block-design image sets. Quality control excluded mean framewise displacement >0.25 mm. Preprocessing and whole-brain statistics used FMRIB Software Library (FSL) fMRI Expert Analysis Tool (FEAT)/FMRIB's Local Analysis of Mixed Effects (FLAME1) (cluster Z>2.3, p<0.05), yielding a left dorsolateral prefrontal cortex (dlPFC) region of interest (ROI) for signal extraction.

Fecal metabolomics focused a priori on tryptophan-pathway metabolites using ultrahigh-performance liquid chromatography-tandem mass spectrometry (UHPLC-MS/MS). Missing values (<3%) were median-imputed, and false discovery rate (FDR) correction was applied.

Microbiome alpha-diversity used 16S ribosomal ribonucleic acid (RNA) sequencing with amplicon sequence variants (ASVs), reporting Shannon and Chao1 indices. No significant associations were observed between social variables and alpha-diversity metrics. Plasma oxytocin was measured by enzyme-linked immunosorbent assay (ELISA) in a subsample (N=77) after removing outliers (>3 standard deviations (SD)).

Generalized linear modeling (GLM) was used to test main and interaction effects; structural equation modeling (SEM, Lavaan) was used to integrate marital status, PES, oxytocin, dlPFC reactivity, and tryptophan metabolites.

Results

Married and unmarried participants were comparable on most baseline characteristics, except age (married participants were older).

A significant interaction between marital status and perceived emotional support emerged for BMI: Among married adults, high support corresponded to markedly lower BMI than low support; no BMI difference was observed among unmarried adults.

Perceived emotional support showed a main association with fewer food-addiction symptoms, aligning with the real-world observation that encouragement, shared meals, and practical help can dampen cue-driven overeating.

Whole-brain analyses identified a significant interaction in the left dlPFC, a hub for executive control and craving inhibition. In married individuals, higher perceived emotional support was associated with stronger dlPFC responses to food cues than lower support; this pattern was not observed among unmarried individuals.

In practice, this suggests that, within stable partnerships, feeling emotionally supported may reinforce top-down control when tempting foods are encountered at home, at work, or while scrolling delivery apps.

Gut-metabolite analyses revealed nuanced links between social relations and tryptophan metabolism. Perceived emotional support related positively to indole and indole-3-carboxylate, indole-pathway metabolites often tied to anti-inflammatory and neuroprotective signaling, and showed an inverse association with 3-indoxyl sulfate, a uremic toxin linked to oxidative stress and cognitive deficits. However, this latter association did not remain statistically significant after multiple-comparison correction.

Interaction effects indicated that, in married adults only, perceived emotional support was positively associated with picolinate (a kynurenine-pathway product with immune-regulatory and neuroprotective features) and negatively associated with tryptophan (consistent with increased downstream metabolism).

These shifts map onto pathways relevant to inflammation control, immune regulation, and energy homeostasis that shape vulnerability to weight gain and stress-related eating.

Taken together, the pattern indicates that supportive relationships, especially high-quality marital bonds, are linked to higher oxytocin, stronger frontal control in response to food, and gut-metabolite profiles consistent with lower inflammation and healthier energy regulation.

In everyday life, that could translate into fewer late-night binges, easier portion control, and steadier weight trajectories, although such behaviors were not directly measured in this study, particularly when partners provide reliable comfort, understanding, and practical support around meals and stress.

Conclusion

This study outlines a plausible oxytocin-mediated pathway by which supportive relationships may contribute to healthier eating and lower the risk of obesity through synchronized changes in the dlPFC and in gut tryptophan metabolism.

For individuals and families, cultivating dependable emotional support, regular check-ins, shared routines, and affectionate contact may strengthen self-control around food and nudge microbial-metabolite signaling toward resilience.

Communities and clinicians can leverage this biology by pairing social-connection strategies with nutrition, activity, and stress-reduction programs. While cross-sectional design and sample size limit causal claims, the integrated oxytocin–brain–gut framework offers clear, testable targets for prevention and intervention in a world where loneliness and obesity often co-occur.

Source:

https://www.news-medical.net/news/20251208/Supportive-marriages-may-shape-appetite-control-through-oxytocin-and-the-braine28093gut-axis.aspx