**Research Article**

**Network Mapping of Environmental Factors Associated with Binge Eating Disorder**

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# Abstract

**Introduction**: Binge eating disorder (BED) is an autonomous DSM-V diagnosis with high prevalence rates and a complicated health sequela. Recent studies endorse a variety of complex environmental factors that can contribute to the development and maintenance of BED. For example, in a cross-sectional mixed-methods study of BED experts' opinions, Bray et al., 2022 identified twelve themes and many subthemes that experts endorsed as environmental factors relevant to BED development and maintenance. These included: (1) invalidation and invalidating environments (100% expert endorsement); (2) systemic issues and systems of oppression (100%); (3) marginalized and under-represented populations (100%); (4) economic precarity (93%); (5) stigmatization and its psychological impacts (93%); (6) trauma and adversity (79%); (7) food insecurity (64%); (8) interpersonal factors (64%); (9) social messaging and social media (50%); (10) nutrition scarcity (43%); (11) predatory food industry practices (29%); and (12) research/clinical gaps (100%). Expert recognition and literature findings suggest these environmental factors often intersect and interact in a variety of complex ways that can disproportionately impact specific vulnerable populations. However, the qualitative nature of these findings can make it challenging to convey and understand the exact nature of the relationships between these themes. Here, we applied two novel network mapping protocols to the qualitative data published in Bray et al., 2022 to provide a visual representation of the complex ways expert-endorsed environmental factors for BED relate to one another and to binge eating.

**Methods**: A secondary data analysis was conducted using mixed-methods data obtained from 14 expert BED researchers, clinicians, and healthcare administrators as published in Bray et al. 2022. Nine themes were identified in the primary study. Reflexive engagement with the primary data resulted in emergence of an additional overarching primary theme/environmental factor of “invalidating experiences and environments,” which was found on secondary analysis to have 100% expert endorsement. This theme has been included here. Additionally, the previous theme of “economic precarity and food/nutrition insecurity/scarcity” has been expanded into three separate themes. These changes have resulted in a total of 12 primary themes/environmental factors recognized here. We applied two different network mapping protocols– Kumu (an online platform) and Python (a versatile programming language) –to the primary themes and subthemes to create network maps that visualize the relationships between environmental factors that experts associated with BED. **Results:** \*\*\*. **Discussion:** \*\*\*. **Conclusion:** Network mapping tools, Kumu and Python, offer innovative methods for visualizing qualitative data analysis findings. These tools enhance the understanding of complex relationships between themes and can inform the development of targeted interventions and policies. Future research should continue to explore the use of network mapping tools to further enhance qualitative data visualization and analysis.

**Keywords:** Binge eating disorder, binge eating, eating disorder, environmental factors, invalidation, invalidating environments, marginalizations, adversity, network mapping, mixed methods.

**Abbreviations**: ACEs, adverse childhood experiences; ALEs, adverse lifetime experiences; BED, binge eating disorder; BIPOC, black indigenous and people of color; COVID-19, Coronavirus 19; DSM-V, Fifth Edition of the American Psychology Association’s Diagnostic Statistical Manual (APA, 2013); LGBTQ2+, lesbian, gay, bisexual, transexual, pansexual, two-hearted and other;

# Introduction

Binge eating disorder (BED) is an autonomous DSM-V mental health diagnosis characterized by discrete, persistent binge episodes (lasting ~2 hours and occurring weekly for >3 months) in which individuals rapidly consume objectively large amounts of food without compensation, associated with loss of control and distress.[1]1 The disorder has high lifetime prevalence rates (5%–13% [2, 3])and a complicated health sequelae [4, 5]{Bray, 2023 #7854}{Bray, 2022 #7838}{Bray, 2022 #7838}associated with genetic and environmental factors.1[6, 7][8-11][9, 12]

More recently, social justice (equal distribution of opportunity, privileges, and wealth within a society[15]) has gained attention and traction socioculturally and in research broadly[16, 17] as well as in the field of eating disorders specifically [18-21]. For example, the Coronavirus 19 **(COVID-19)** pandemic has caused an increase in observational studies that have helped improve our understanding as a field of the experience of binge eating disorder from those who experience it [18, 20] and tend to identify important social justice issues that seem highly relevant to binge eating disorder pathology [18-21]. These include eating disorder stigmatization and lack of diversity, inclusion, and representation for individuals with marginalized identities [20]. A recent review on binge eating disorder epidemiology [19] noted that less than half of adults with binge eating disorder are recognized in healthcare and minority status, deprivation, violence, trauma, and major mental health illnesses were identified as possible risk factors for binge eating disorder [19]. However, these proposed environmental risk factors lack empirical testing and more information on the contributions of environmental factors contributing to binge eating disorder is warranted and needed. Therefore, we interviewed 14 systematically identified expert binge eating disorder researchers, clinicians, and healthcare administrators on their perspectives of adult binge eating disorder pathology and treatment broadly. Here, we report on environmental factors identified as relevant to adult binge eating disorder pathology through reflexive thematic analysis of the semi-structured interviews that were conducted and recorded anonymously with the 14 systematically identified experts in the field.

For example, studies have shown that 93.4% – 96.8% of individuals who meet DSM criteria for binge eating disorder never receive a formal diagnosis [68, 94]; 67.3% do not perceive the need for treatment [68]; and 56.4% – 86.8% never receive or pursue treatment [2, 68]. Moreover, individuals with eating disorder symptoms who are underweight, female, affluent, and/or white are more likely than their respective counterparts to perceive a need for treatment or receive a diagnosis or treatment [68].

More recently, the Coronavirus 19 (COVID-19) pandemic (~2019–2023) prompted an increase in observational and qualitative studies that have helped improve our understanding of the experience of BED from those who experience it.1,2[18-21] These studies aligned with a growing awareness of the importance for justice, equity, diversity, inclusion, and access both socioculturally, clinically, and in research broadly and specific to eating disorders and BED.1,2{Hudson, 2007 #4907;Sonneville, 2018 #7208;Bray, 2025 (submitted December 2024) #7963}[68, 94]

increasing awareness of rest on pre-pandemic findings indicating that

For example, studies have shown that 93.4% – 96.8% of individuals who meet DSM criteria for binge eating disorder never receive a formal diagnosis [68, 94]; 67.3% do not perceive the need for treatment [68]; and 56.4% – 86.8% never receive or pursue treatment [2, 68]. Moreover, individuals with eating disorder symptoms who are underweight, female, affluent, and/or white are more likely than their respective counterparts to perceive a need for treatment or receive a diagnosis or treatment [68].

These findings tend to emphasize the role of environmental factors as being highly salient, especially in the ~95% of individuals with BED who never receive a formal diagnosis or treatment.1-3 These findings also tend to identify important social justice issues (e.g., issues related to equal distribution of opportunity, privileges, and wealth within a society [15]) as being highly relevant to BED pathology [18–21] 1. For example, Bray et al (2022) conducted a cross-sectional mixed-methods study of environmental factors expert BED researchers, clinicians, and healthcare administrators associate with BED development and maintenance 1. The most commonly endorsed themes included:

1. Invalidation and invalidating environments (100% expert endorsement).
2. Systemic issues and systems of oppression (100% expert endorsement).
3. Marginalized and under-represented populations (100% expert endorsement).
4. Economic precarity (93% expert endorsement).
5. Stigmatization and its psychological impacts (93% expert endorsement).
6. Trauma and adversity (79% expert endorsement).
7. Food insecurity/scarcity (64% expert endorsement).
8. Interpersonal factors (64% expert endorsement).
9. Social messaging and social media (50% expert endorsement).
10. Nutrition insecurity/scarcity (43% expert endorsement).
11. Predatory food industry practices (29% expert endorsement.
12. Research/clinical gaps and directives (100% expert endorsement).

These themes are robustly supported in the literature. (e.g., [20] [19]1,2; see citations in Bray et al., 2022). Moreover, expert recognition and literature findings suggest these environmental factors tend to intersect and interact in a variety of complex ways that often disproportionately impact specific vulnerable and marginalized populations that also tend to be under-represented in research (see Bray et al., 2022 and citations therein).

For example, findings demonstrate that members of the black indigenous and people of color (BIPOC) and lesbian, gay, bisexual, transexual, pansexual, two-hearted and other (LGBTQ2+) communities have two to three-fold higher BED risk and prevalence rates relative to their white, female cis-gendered, heterosexual peers 1. These and other marginalized individuals (e.g., men, ethnic minorities, elderly, individuals of low socioeconomic status, etc.) are also more likely to experience a variety of environmental factors there were also identified as primary themes in Bray et al., 2022 and associated with theme 3, “marginalized and under-resourced populations). These included:

1. Discrimination (themes 1–3, 5–6, & 12).1,4-12
2. Stigmatization (themes 5, 1–3, 6, & 12).1,10,13-17
3. Unemployment, homelessness, and poverty (themes 4, 1–3, 5–6, & 12).1,18,19
4. Food insecurity (themes 7, 1–4, 6, 10–12).1,20-22
5. Direct targeting by tobacco-owned food and beverage marketing programs (themes 11, 2–3, 9).1,23

These same individuals and populations are also *less* likely to be screened by healthcare providers for an eating disorder, included in eating disorder research, recognize the need for BED treatment when present, or pursue, access, or engage in treatment when needed (themes 1-5, 9, 12),24-31 due to a variety of complex issues 1,3.

Each of these factors have been independently linked to increasing risk for BED 1,13,32-35 and experiencing more than one factor is thought to exponentially increase BED risk and prevalence, specifically among marginalized individuals and populations 1. However, the often-segregated nature of the literature base and the qualitative nature of the findings presented in Bray et al., 2022 can make it difficult to understand and convey exactly how these factors relate to one another and to BED pathology. Here, we applied two novel network mapping protocols 36 to the primary themes and sub-themes identified in Bray et al., 2022 to provide a visual representation of the complex ways these environmental factors relate to one another and to binge eating.

# Methods

## Original (Primary) Data

In Bray et al., 2022, we conducted a cross-sectional, mixed-methods study of expert perceptions on environmental factors that contribute to binge eating disorder (BED, an autonomous DSM-V diagnosis characterized by discrete rapid consumption of objectively large amounts of food without compensation, associated with loss of control and distress). Fourteen expert binge eating disorder researchers, clinicians, and healthcare administrators were identified internationally based on federal funding, PubMed-indexed publications, active practice in the field, leadership in relevant societies, and/or clinical and popular press distinction. Semi-structured interviews were recorded anonymously and analyzed by ≥2 investigators using reflexive thematic analysis and quantification.

In the original publication, nine primary themes were identified that were spontaneously identified or endorsed by BED experts as environmental factors associated with BED. The original 9 themes and their expert endorsement frequencies (expressed as percentage of 14 total experts) were as follows: **1)** systemic issues and systems of oppression (100%); **2)** marginalized and under-represented populations (100%); **3)** economic precarity and food/nutrition insecurity/scarcity (93%); **4)** stigmatization and its psychological impacts (93%); **5)** trauma and adversity (79%); **6)** interpersonal factors (64%); **7)** social messaging and social media (50%); **8)** predatory food industry practices (29%); and **9)** research/clinical gaps and directives (100%).

Reflexive engagement with the primary data resulted in emergence of an additional overarching primary theme/environmental factor of “invalidating experiences and environments,” which was found on secondary analysis to have 100% expert endorsement. This theme has been included here. Additionally, the previous theme of “economic precarity and food/nutrition insecurity/scarcity” has been expanded into three separate themes. These changes have resulted in a total of 12 primary themes/environmental factors recognized and used here:

1. Invalidation and invalidating environments (100% expert endorsement).
2. Systemic issues and systems of oppression (100%).
3. Clinical and academic/research gaps (100%).
4. Marginalized and under-represented populations (100%).
5. Economic precarity (93%).
6. Stigmatization and its psychological impacts (93%).
7. Trauma and adversity (79%).
8. Food insecurity/scarcity (64%).
9. Interpersonal factors (64%).
10. Social messaging and social media (50%).
11. Nutrition insecurity/scarcity (43%).
12. Predatory food industry practices (29%).

Here, the themes and subthemes identified in Bray et al., 2022 and reconstructed here – as well as the number and percent of participants who endorsed each theme and the way the themes were described in Bray et al., 2022 (by experts and in the literature) as relating (or not relating) to one another – were entered into Kumu and/or Python as mapping entities/nodes for network mapping visualization, as described below.

### Table 1. Environmental Factors Associated with Binge Eating Disorder by Experts in the Field, as Published in Bray et al., 2022

| **Table 1. Environmental Factors Associated with Binge Eating Disorder by Experts in the Field, as Published in Bray et al., 2022** | | |
| --- | --- | --- |
| **Environmental Factors Identified by BED Experts** | **Expert Endorsement**  **n (n/14)** | **Empirical Support** |
| I. Invaliding Environments & Experiences\* | 14 (100%) | 1,2, 3 |
| i. Marginalized and under-represented populations | 14 (100%) | Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BED treatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.  1,2, 3 |
| *a. Low socioeconomic status/economic insecurity* | *13 (93%)* | Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BEDtreatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.  1,2, 3 |
| *b. Food or nutrition scarcity* | *10 (71%)* | Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BEDtreatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.  1,2, 3 |
| *c. Male sex/gender* | *8 (57%)* | 1,2, 3 |
| *d. Racial and ethnic minorities (e.g., BIPOC)* | *5 (36%)* | Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BEDtreatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.  1,2, 3 |
| *e. LGBTQ2+* | *3 (21%)* | Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BEDtreatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.  1,2, 3 |
| *f. Age* | *2 (14%)* | 1,2, 3 |
| *g. Religion* | *1 (7%)* | 1,2, 3 |
| ii. Systemic Discrimination | 12 (82%) | Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BEDtreatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.  1 |
| *a. Body weight/shape/size discrimination* | *12 (82%)* | 1,2, 3 |
| *b. Structural racism* | *2 (14%)* | Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BEDtreatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.  1 |
| *c. Structural sexism* | *1 (7%)* | 1, |
| iii. Media messaging and sociocultural ideals/mandates | 12 (82%) | 1 |
| *a. Perpetuating stigmatization* | *12 (82%)* | 1,2, 3 |
| *b. Body weight/shape/size ideals & discrimination* | *12 (82%)* | 1 |
| *c. “Diet culture”* | *3 (21%)* | 1 |
| *d. Movement & fitness ideals* | *2 (14%)* | 1 |
| iv. Insurance and healthcare systems | 9 (64%) | 1-3 |
| *a. Insurance costs and coverage* | *6 (43%)* | 3 |
| *b. Systemic stigmatization from healthcare providers* | *6 (43%)* | 1-3  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: perceive stigmatization, screened by healthcare providers for ED 25,26; **v)** recognize the need for BED treatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31.  Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| *c. Geographical access to treatment resources* | *4 (29%)* | 3 |
| *d. Mandated movement for individuals in larger bodies* | *2 (14%)* | 1,2 |
| *e. Provider scarcity* | *1 (7%)* | 1,3 |
| v. Predatory Food Industries/Environments | 4 (29%) | 1  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: directly targeted by tobacco-owned food and beverage marketing programs 23; |
| vi. Abuse (sexual, emotional, or physical) | 4 (29%) | 1,2,38 |
| vii. Geographic systems1 | 4 (29%) | 1,3 |
| viii. Eating disorder research as a field2 | 3 (21%) | 1, 3  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **less likely to be**  included in ED research 24 |
| ix. Federal funding for eating disorder research3 | 2 (14%) | 1, 3  Racial, ethnic, sexual, and trans/nonbinary gender minorities are less likely to be included in ED research 24 |
| x. Economic exploitation4 | 1 (7%) | 1  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, perceive discrimination 4-12 and stigmatization 10,13-17; Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| xi School systems | 1 (7%) | 1 |
| xii. Legal systems | 1 (7%) | 1 |
| xiii. Justice systems (police harassment) | 1 (7%) | 1 |
| **II. Systematic Issues & Systems of Oppression** | 14 (100%) | 1-3,38  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** more likely to experience homelessness 18, unemployment 19, poverty 19, and food insecurity 20-22; **ii)** more likely to experience and perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** being directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** less likely to be included in eating disorder research 24 or screened by healthcare providers for an eating disorder 25,26; **v)** generally less likely to recognize the need for binge eating disorder treatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.  [45], unemployment [46], poverty [46], and food insecurity [47-49]; **ii)** more likely to experience and perceive discrimination [50-58] and stigmatization [56, 59-63]; **iii)** being directly targeted by tobacco-owned food and beverage marketing programs [64]; **iv)** less likely to be included in eating disorder research [65] or screened by healthcare providers for an eating disorder [66, 67]; **v)** generally less likely to recognize the need for binge eating disorder treatment when present [68][65, 66, 68-72] [34, 59, 73-75][76][65][77, 78][64, 79-88]  Examples include: education and enforcement of **equal eating disorder screening from healthcare provider**s across race, ethnicity, gender, sex, sexual orientation, weight- and socioeconomic status (as well as healthcare provider education on implicit biases and stigmatizations about binge eating disorder) 39; inclusion of minority and marginalized populations in eating disorder research 24; equal funding for binge eating disorder research relative to other disorders of similar prevalence 40,41; as well as consensus on which agencies should provide such funding; and public education and policy change in food industry practices that target minorities and abet binge eating 23,42-51. |
| i. Systemic Discrimination | 12 (82%) | 1,3  [50-58][59, 71, 72][50-58, 110, 111]  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BEDtreatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.  Bray et al., 2022 |
| *a. Body weight/shape/size discrimination* | *12 (82%)* | 1,3  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **more likely to** perceive discrimination 4-12 and stigmatization 10,13-17; Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| *b. Structural racism* | *2 (14%)* | 1  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BEDtreatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| *c. Structural sexism* | *1 (7%)* | 1  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BEDtreatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| ii. Media messaging and sociocultural ideals/mandates | 12 (82%) | 1, 3 |
| *a. Perpetuating stigmatization* | *12 (82%)* | 1, 3 |
| *b. Body weight/shape/size ideals & discrimination* | *12 (82%)* | 1, 3 |
| *c. “Diet culture”* | *3 (21%)* | 1 |
| *d. Movement & fitness ideals* | *2 (14%)* | 1-3 |
| iii. Insurance and healthcare systems | 9 (64%) | 1-3 |
| *a. Insurance costs and coverage* | *6 (43%)* | 1-3 |
| *b. Treatment costs* | *6 (43%)* | 2  1  3 |
| *c. Systemic stigmatization from healthcare providers* | *6 (43%)* | 1-3,38  **equal eating disorder screening from healthcare provider**s across race, ethnicity, gender, sex, sexual orientation, weight- and socioeconomic status (as well as healthcare provider education on implicit biases and stigmatizations about binge eating disorder) 39;  stigmatization 10,13-17; less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| *d. Geographical access to treatment resources* | *4 (29%)* | 1,3 |
| *e. Mandated movement for individuals in larger bodies* | *2 (14%)* | 1,3 |
| *f. Provider scarcity* | *1 (7%)* | 1  3 |
| iv. Predatory Food Industries/Environments | 4 (29%) | 1,38directly targeted by tobacco-owned food and beverage marketing programs 23 |
| v. Abuse (sexual, emotional, or physical) | 4 (29%) | 1-3,38 |
| vi. Geographic systems1 | 4 (29%) | 1,3 |
| vii. Eating disorder research as a field2 | 3 (21%) | 2  39; inclusion of minority and marginalized populations in eating disorder research 24; equal funding for binge eating disorder research relative to other disorders of similar prevalence 40,41; as well as consensus on which agencies should provide such funding; and public education and policy change in food industry practices that target minorities and abet binge eating 23,42-51.  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **less likely to be** included in ED research 24 |
| vii. Federal funding for eating disorder research3 | 2 (14%) | 1 |
| vii. Economic exploitation4 | 1 (7%) | 1,3  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 |
| vii. School systems | 1 (7%) | 1 |
| vii. Legal systems | 1 (7%) | 1 |
| vii. Justice systems (police harassment) | 1 (7%) | 1 |
| **III. Marginalized and under-represented populations** | 14 (100%) | 1-3  181920-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BEDtreatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.  Paradigm shift from “SWAG” stereotype 52 to a new recognition of racial, ethnic, and sexual minorities and other non-SWAG populations (e.g., males 27, individuals in “normally” sized/weighted/shaped bodies 27, and individuals with low socioeconomic status 20,27,32,33,53, especially those with past or present histories of food/nutrition insecurity 20,32-34,37,53-56, or use of government assistance programs like SNAP, food stamps, or welfare 20,37,54,57). Also Bray et al., 2022, 2025a  Studies have shown that 93.4% – 96.8% of individuals who meet DSM criteria for binge eating disorder never receive a formal diagnosis 27,58; 67.3% do not perceive the need for treatment 27; and 56.4% – 86.8% never receive or pursue treatment 27,59. Symptomatic SWAGs are more likely than their respective counterparts to perceive a need for treatment or receive a diagnosis or treatment 27.  BIPOC: higher BED risk and prevalence rates 30,31,60, but make up <10% of participants in binge eating disorder research studies 24, are less likely to be screened by medical professionals for eating disorders 25,26, and are 50% less likely to be diagnosed or receive care 24,25,28-31.  LGBPTQ2+ increased ED risk 61 and prevalence 13,20,62. in adults 13,20,61,62 and youth 13,20.  BIPOC & LGBTQ2+ have higher risk precalence for food/nutrition scarcity, stigmatization, and discrimination 13,30,31.  Higher food insecurity in BIPOC vs. white 21,22.  Higher family rejection 18, homelessness 18, adult unemployment 19, poverty 19, and food insecurity 20,21 in LGBTQ2+ vs heterosexual cis-gendered counterparts.  BIPOC, LGBTQ2+, & other marginalized and minority populations have higher stigmatization 10,13-17, with higher levels of enacted stigma associated with higher odds of binge eating in transgender young adults 13. |
| i. Low socioeconomic status/economic insecurity | 13 (93%) | 1,23181920,27,32,33,5320,37,54,5720,21 Bray et al., 2022, 2025a |
| ii. Food or nutrition scarcity | 10 (71%) | 1-3,38  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: poverty 19, food insecurity 20-22; Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.  Paradigm shift from “SWAG” stereotype 52 to a new recognition of racial, ethnic, and sexual minorities and other non-SWAG populations (including those with past or present histories of food/nutrition insecurity 20,32-34,37,53-56, or use of government assistance programs like SNAP, food stamps, or welfare 20,37,54,57). Also Bray et al., 2022, 2025a  BIPOC & LGBTQ2+ have higher risk prevalence for food/nutrition scarcity, stigmatization, and discrimination 13,30,31.  Higher food insecurity in BIPOC vs. white 21,22.  Higher food insecurity 20,21 in LGBTQ2+ vs heterosexual cis-gendered counterparts. |
| iii. Male sex/gender | 8 (57%) | 52 276113,20,6213,20,61,6213,201-3  10,13-17; **iii)** 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BED treatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| iv. Racial and ethnic minorities (e.g., BIPOC) | 5 (36%) | 1,2, 3  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BED treatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.  **equal eating disorder screening from healthcare provider**s across race, ethnicity, gender, sex, sexual orientation, weight- and socioeconomic status (as well as healthcare provider education on implicit biases and stigmatizations about binge eating disorder) 39.  Paradigm shift from “SWAG” stereotype 52 to a new recognition of racial, ethnic, and sexual minorities and other non-SWAG populations  Symptomatic SWAGs are more likely than their respective counterparts to perceive a need for treatment or receive a diagnosis or treatment 27.  BIPOC: higher BED risk and prevalence rates 30,31,60, but make up <10% of participants in binge eating disorder research studies 24, are less likely to be screened by medical professionals for eating disorders 25,26, and are 50% less likely to be diagnosed or receive care 24,25,28-31.  BIPOC & LGBTQ2+ have higher risk prevalence for food/nutrition scarcity, stigmatization, and discrimination 13,30,31.  Higher food insecurity in BIPOC vs. white 21,22.  BIPOC, LGBTQ2+, & other marginalized and minority populations have higher stigmatization 10,13-17, with higher levels of enacted stigma associated with higher odds of binge eating in transgender young adults 13. |
| v. Lesbian, gay, bisexual, transgender, queer, two-souled, nonbinary, other (LGBTQ2+) | 3 (21%) | 1-3,38  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BED treatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| vi. Age | 2 (14%) | 1-3  **equal eating disorder screening from healthcare provider**s across race, ethnicity, gender, sex, sexual orientation, weight- and socioeconomic status (as well as healthcare provider education on implicit biases and stigmatizations about binge eating disorder) 39; |
| vii. Religion | 1 (7%) | 1-3  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BEDtreatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| **IV. Economic Insecurity** | 13 (93%) | 1-3,38  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19…Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| i. Economic aspects of binge eating disorder | 13 (93%) | 1-3,38 |
| *a. Direct connections between BED pathology & economic status* | *5 (36%)* | 1,2,38  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity … less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| ii. Potential mediators/moderators of relationship between economic status & BED pathology | 9 (64%) | 1,2,38  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research … less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| *a. Food insecurity* | *5 (36%)* | 1,2,38  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| *b. Nutrition access/scarcity* | *5 (36%)* | 1,2,38 |
| *c. Food environment* | *3 (21%)* | 1,2,38  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **more likely to be** directly targeted by tobacco-owned food and beverage marketing programs …Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| *d. Mental health risks* | *2 (14%)* | 1-3,38 |
| *e. COVID-10 pandemic* | *2 (14%)* |  |
| *f. Access to treatment resources* | *2 (14%)* | Racial, ethnic, sexual, and trans/nonbinary gender minorities are: less likely to receive treatment when needed 24,25,27-31. |
| *g. Weight biases and descrimination5* | *1 (7%)* | 1-3,38 |
| **V. Stigmatization and its Psychological Impacts** | **13 (93%)** | 1-3,38 |
| i. Forms of stigmatization recognized as relevant to BED | 13 (93%) |  |
| *a. Body weight/shape/size stigmatization and discrimination* | *12 (82%)* | 1-3,38 |
| *b. Eating disorder diagnosis stigmatization* | *5 (36%)* | 1-3,38 |
| *c. Mental health diagnosis stigmatization* | *5 (36%)* | 1-3 |
| *d. Any medical diagnosis stigmatization* | *1 (7%)* | 1-3 |
| *e. Stigmatization around perfectionistic food/eating ideals* | *1 (7%)* | 1-3,38 |
| *These stigmatizations suggested as having higher prevalence in specific populations6* | 2 (14%) | 1,2  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **more likely to** perceive discrimination 4-12 and stigmatization 10,13-17; **and less likely to be** screened by healthcare providers for ED 25,26. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| ii. Body weight/shape/size stigmatization described as: | 11 (79%) | 1-3,38 |
| *a. Potentially exacerbating BED symptoms and severity* | *11 (79%)* | 1-3,38 |
| *b. Prevalent among healthcare providers and in the medical system* | *6 (43%)* | 1-3 |
| *c. Core to BED pathology* | *4 (29%)* | 1-3,38 |
| *d. Area requiring better understanding of its trajectory and impact* | *4 (29%)* | 1-3,38 |
| *e. Traumatic7* | *3 (21%)* | 1,38 |
| *f. Possibly varying by ethnicity8* | *1 (7%)* | 1-3,38  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **more likely to**  perceive stigmatization 10,13-17; **less likely to be** screened by healthcare providers for ED 25,26; recognize the need for BED treatment when present 27; and less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| **VI. Trauma and Adversity** | **11 (79%)** | 1-3,38 |
| i. Relevant forms of trauma/adversity | 7 (50%) |  |
| *a. Abuse (sexual, emotional, or physical; esp. early childhood abuse)* | *4 (29%)* | 1,2,38 |
| *b. Body weight/shape/size stigmatization* | *3 (21%)* | 1,2,38 |
| *d. Invalidating/oppressive experiences/environments* | *2 (14%)* | 1 |
| *e. Interpersonal trauma* | *2 (14%)* | 1 |
| *f. Mandated movement or physical activity9* | *2 (14%)* | 1,2,38 |
| *g. Childhood of food scarcity/insecurity as ACES* | *1 (7%)* | 1,2,38 |
| *h. Chronic dieting* | *1 (7%)* | 1 |
| *i. Untreated diagnoses (e.g., ADHD)* | *1 (7%)* | 1,2,38 |
| *j. Impacts of IBS* | *1 (7%)* | 1,2 |
| *k. Trauma related to self-neglect and negative views on self-care10* | *1 (7%)* | 1 |
| ii. Relationship between trauma/adversity & BED | 11 (79%) | 1,2,38 |
| *a. Trauma/adversity as relevant to BED psychopathology* | *11 (79%)* | 1,2,38 |
| *Trauma/adversity highly relevant for a minority with that comorbidity* | *1 (7%)* | 1,2,38 |
| *b. Trauma/adversity as increasing risk for BED* | *5 (36)* | 1,2,38 |
| *Cited research findings* | *2 (14%)* | 1,2,38 |
| *ACES can result in PTSD and BED* | *2 (14%)* | 1,2,38 |
| *Trauma/adversity increase risk for m[any] psychiatric problems* | *2 (14%)* | 1,2,38 |
| *Trauma/adversity often precede BED (not vice versa)* | *1 (7%)* | 1,2,38 |
| *Childhood (but not adult) trauma/adversity as risk factor* | *1 (7%)* | 1,2,38 |
| *PTSD highly comorbid with BED and food addiction* | *1 (7%)* | 1,2,38 |
| *c. Neurobiological impacts of trauma/adversity may prime BED* | *2 (14%)* | 1,2,38 |
| *Negative impact on self-regulation* | *1 (7%)* | 1,2,38 |
| *d. Binge eating to cope with trauma/adversity11* | *2 (14%)* | 1,2,38 |
| *e. Trauma/adversity as exacerbate BED symptoms* | *2 (14%)* | 1,2,38 |
| *f. Additional possible mechanistic pathways* | *2 (14%)* | 1,2,38 |
| *Gut microbiota as possible underlying mechanism* | *1 (7%)* | 1,2,38 |
| *IBS as mediator, moderator, and possible underlying mechanism* | *1 (7%)* | 1,2,38 |
| *Stress as possible underlying mechanism* | *1 (7%)* | 1,2,38 |
| *Trauma/adversity may burden BED treatment distress tolerance* | *1 (7%)* | 1,2,38 |
| *g. Trauma/adversity as comorbid/coexisting* | *1 (7%)* | 1,2,38 |
| iii. Critical considerations | 5 (36%) | 1,2,38 |
| *a. Importance of addressing trauma and adversity in treatment* | *4 (29%)* | 1,2,38 |
| *Importance of establishing how to address trauma/adversity history in treatment* | *1 (7%)* | 1,2,38 |
| *b. Importance of screening for trauma and adversity* | *2 (14%)* | 1,2,38 |
| *c. Need for greater understanding of the relationship between trauma/adversity and BED* | *1 (7%)* | 1,2,38 |
| *d. Literature findings on poor self-report of trauma* | *1 (7%)* | 1,2,38 |
| **VII. Food Insecurity** | **9 (64%)** | **Racial, ethnic, sexual, and trans/nonbinary gender minorities are: i) insecurity 20-22; Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.** |
| i. Potentially disrupting one’s relationship with food or eating | 5 (36%) |  |
| ii. Linked to economic insecurity | 5 (36%) | Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **more likely to experience** poverty 19 and food insecurity 20-22. |
| iii. Increasing risk for other physical and psychological health problems | 4 (29%) |  |
| iv. Linked to the COVID-19 pandemic | 2 (14%) |  |
| v. Childhood adverse food experiences as important ACES12 | 1 (7%) |  |
| **VIII. Interpersonal Factors** | **9 (64%)** |  |
| i. Ways interpersonal deficits or negative interpersonal relationships can impact BED | 7 (50%) |  |
| *a. Social sensitivity related to social anxiety/fear/threat perception* | *5 (29%)* |  |
| *b. Interpersonal deficits affecting relationships and social support13* | *3 (21%)* |  |
| *c. Socializing around food/eating as a problematic social activity* | *3 (21%)* |  |
| *d. Social anxiety as a relevant comorbidity in BED* | *3 (21%)* |  |
| *Referenced research on the role of social threat* | *1 (7%)* |  |
| *Suggested social anxiety disorder is “the most common additional mental health problem for people with an eating disorder”* | *1 (7%)* |  |
| *e. Spousal relationships, intimacy, and sexuality* | *2 (14%)* |  |
| *f. Negative social experiences or deficiency communication directly catalyzing or contributing to binge eating behavior* | *2 (14%)* |  |
| ii. Ways aspects of BED can contribute to interpersonal deficits | 5 (36%) |  |
| *a. Body weight/shape/size stigmatization* | *2 (14%)* |  |
| *b. Body weight/shape/size overvaluation* | *1 (7%)* |  |
| *c. Social ranking* | *1 (7%)* |  |
| *d. Broader social phenomenon14* | *1 (7%)* |  |
| *e. COVID-19 quarantine/isolation* | *1 (7%)* |  |
| iii. Impacts of interpersonal factors on BED pathology | 9 (64%)15 |  |
| *a. Negative relationship between interpersonal factors and BED pathology* | *7 (36%)* |  |
| *b. Positive relationships between social interaction and BED pathology16* | *3 (21%)4* |  |
| *Positive impacts of community* | *2 (14%)* |  |
| *Benefits of family* | *1 (7%)* |  |
| **IX. Social Messaging and Social Media** | **7 (50%)** |  |
| i. Significantly relevant to binge eating disorder pathology | 7 (50%) |  |
| *a. Social media as relevant* | *5 (36%)* |  |
| *b. Social messages as relevant* | *3 (21%)* |  |
| ii. Relationship described as exclusively negative17 | 4 (28%) |  |
| iii. Relationship described as primarily negative but with some positive aspects or potential | 3 (21%) |  |
| iv. Relationship described as exclusively positive | 0 (0%) |  |
| **X. Nutrition Scarcity** | **6 (43%)** | **Racial, ethnic, sexual, and trans/nonbinary gender minorities are: i) homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; direct targeting by tobacco-owned food and beverage marketing programs 23;**  **Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.** |
| i. Linked to socioeconomic status | 4 (29%) |  |
| ii. Linked to food environment | 3 (21%) |  |
| iii. Cited research findings linking nutrition scarcity to binge eating and obesity18 | 1 (7%) |  |
| iv. Cited research relating urbanization factors to increased risk for BED19 | 1 (7%) |  |
| **XI. Predatory Food Industry Practices** | **4 (29%)** | **Racial, ethnic, sexual, and trans/nonbinary gender minorities are: more likely to be directly targeted by tobacco-owned food and beverage marketing programs 23;** |
| i. “Predatory” food industry practices described20 | 4 (29%) |  |
| *a. Describe foods intentionally designed to produce specific reward responses that promote excessive consumption* | *2 (14%)* |  |
| *b. Comparisons made between “big tobacco” and “big food” industries* | *2 (14%)* | Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37. |
| ii. Food industry practices described as public policy issue | 2 (14%) |  |
| iii. Call for public education21 | 2 (14%) |  |
| iv. Express view that disordered eating behavior can be associated with specific foods, but can be extinguished | 2 (14%) |  |
| v. Rewarding food properties acknowledged but not described as intentionally engineered | 1 (7%) |  |
| **XII. Research and Clinical Gaps** | **14 (100%)** | **Racial, ethnic, sexual, and trans/nonbinary gender minorities are: i) homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; ii) perceive discrimination 4-12 and stigmatization 10,13-17; iii) directly targeted by tobacco-owned food and beverage marketing programs 23; iv) included in ED research 24 screened by healthcare providers for ED 25,26; v) recognize the need for BEDtreatment when present 27; and vi) less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.** |
| i. Need for change in the systems that abet BED | 10 (71%) |  |
| *a. Eating Disorder Field* | *5 (36%)* |  |
| *Eating disorder research funding22* | *2 (14%)* |  |
| *Mandated movement perpetuated by healthcare system* | *2 (14%)* |  |
| *Recognizing implicit weight bias/stigma/discriminating in the field* | *1 (7%)* | **equal eating disorder screening from healthcare provider**s across race, ethnicity, gender, sex, sexual orientation, weight- and socioeconomic status (as well as healthcare provider education on implicit biases and stigmatizations about binge eating disorder) 39; |
| *b. Food systems & availability* | *4 (29%)* |  |
| *Food industry practices* | *2 (14%)* | Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **more likely to be diretly targeted** by tobacco-owned food and beverage marketing programs |
| *Food stamp allotment* | *1 (7%)* |  |
| *c. Other systems of oppression23* | *2 (14%)* | **equal eating disorder screening from healthcare provider**s across race, ethnicity, gender, sex, sexual orientation, weight- and socioeconomic status (as well as healthcare provider education on implicit biases and stigmatizations about binge eating disorder) 39; |
| *d. Economic aspects that prevent treatment access* | *1 (7%)* | *Bray et al., 2025a,b* |
| ii. Understanding the role of environmental impact/risk factors on BED | 5 (36%) |  |
| *a. Traumatic impacts of mandated movement* | *2 (14%)* |  |
| *b. Impacts of trauma* | *1 (7%)* |  |
| *c. Impacts of “broader sociocultural issues”* | *1 (7%)* |  |
| *d. Impacts of community* | *1 (7%)* |  |
| *e. Impacts of interpersonal threat/threat sensitivity* | *1 (7%)* |  |
| *f. Impact of environmental pollution* | *1 (7%)* |  |
| iii. Inclusion of minority and marginalized populations | 4 (29%) | Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **less likely to be**  included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BED treatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.**equal eating disorder screening from healthcare provider**s across race, ethnicity, gender, sex, sexual orientation, weight- and socioeconomic status (as well as healthcare provider education on implicit biases and stigmatizations about binge eating disorder) 39;  Bray et al., 2025a,b (treatment barriers) |
| *a. Including and reaching men* | *1 (7%)* | **equal eating disorder screening from healthcare provider**s across race, ethnicity, gender, sex, sexual orientation, weight- and socioeconomic status (as well as healthcare provider education on implicit biases and stigmatizations about binge eating disorder) 39; |
| *b. Including individuals in normal-sized bodies* | *1 (7%)* | **equal eating disorder screening from healthcare provider**s across race, ethnicity, gender, sex, sexual orientation, weight- and socioeconomic status (as well as healthcare provider education on implicit biases and stigmatizations about binge eating disorder) 39; |
| *c. Identifying struggles unique to marginalized populations* | *1 (7%)* | **equal eating disorder screening from healthcare provider**s across race, ethnicity, gender, sex, sexual orientation, weight- and socioeconomic status (as well as healthcare provider education on implicit biases and stigmatizations about binge eating disorder) 39;  Racial, ethnic, sexual, and trans/nonbinary gender minorities are: **i)** homelessness 18, unemployment 19, poverty 19, food insecurity 20-22; **ii)** perceive discrimination 4-12 and stigmatization 10,13-17; **iii)** directly targeted by tobacco-owned food and beverage marketing programs 23; **iv)** included in ED research 24 screened by healthcare providers for ED 25,26; **v)** recognize the need for BEDtreatment when present 27; and **vi)** less likely to receive treatment when needed 24,25,27-31. Each of these factors have been independently linked to increasing risk for binge eating disorder 13,32-34,37.  Bray et al., 2025a,b (treatment barriers) |
| *d. Information dissemination24* | *1 (7%)* |  |
| iv. Recognizing and understanding weight bias/stigma/discrimination | 4 (29%) | **equal eating disorder screening from healthcare provider**s across race, ethnicity, gender, sex, sexual orientation, weight- and socioeconomic status (as well as healthcare provider education on implicit biases and stigmatizations about binge eating disorder) 39; |
| *a. Research investigation of forms, prevalence, and impacts* | *4 (29%)* |  |
| *b. Recognizing implicit weight bias/stigma/discrimination in the field* | *1 (7%)* | **equal eating disorder screening from healthcare provider**s across race, ethnicity, gender, sex, sexual orientation, weight- and socioeconomic status (as well as healthcare provider education on implicit biases and stigmatizations about binge eating disorder) 39; |
|  |  |  |
| v. Taking & understanding the narrative of individuals with BED | 3 (21%) |  |
| *a. Identifying how to “listen for what people are telling us about their experience?”* | *1 (7%)* |  |
| *b. Listening to- and understanding the unique experiences of individuals with BED* | *1 (7%)* |  |
| vi. Understanding consequences of BED | 2 (14%) |  |
| *a. Impacts on interpersonal relationships* | *2 (14%)* |  |
| *b. Impacts on threat sensitivity* | *1 (7%)* |  |
| *c. Impacts on expression of sexuality* | *1 (7%)* |  |
| **Table 1: Environmental Factors Associated with Binge Eating Disorder by Experts in the Field, as Published in Bray et al., 2022.** A recent cross-sectional mixed-methods study of binge eating disorder experts' opinions (Bray et al., 2022) identified twelve themes (originally collapsed into 9 but expanded into 12 here) and many subthemes that experts endorsed as environmental factors relevant to binge eating disorder. These included: (1) invalidating environments (100% expert endorsement); (2) systemic issues and systems of oppression (100% expert endorsement); (3) marginalized and under-represented populations (100% expert endorsement); (4) economic precarity (93% expert endorsement); (5) stigmatization and its psychological impacts (93% endorsement); (6) trauma and adversity (79% endorsement); (7) food insecurity (64% endorsement); (8) interpersonal factors (64% endorsement); (9) social messaging and social media (50% endorsement); (10) nutrition scarcity (43% endorsement); (11) predatory food industry practices (29% endorsement); and (12) research/clinical gaps (100% endorsement).  **Table Legend:** Results expressed as n (%), in which percentages are n/14 times 100.  **Table Footnotes:** \*Subthemes that endorsed the role of invalidating environments and experiences in BED pathology were largely identical to those endorsed for the role of systemic issues and systems of oppression (Theme II here) and marginalized, invalidated, and under-resourced communities (Theme III here). 1Defined as a relationship in economic wealth distribution wherein a worker does not receive proper compensation for his/her work (Arnold, 1995), e.g., from an employer or with a spouse. 2E.g., geographical inequities in provider and treatment access, and in the Supplemental Nutrition Assistance Program (SNAP) that can limit its effectiveness (Levine 2018; Hoynes *et al.,* 2022; Ziliak 2016) treatment access. 3E.g., operating from an anorexic-centric perspective/understanding. 4E.g., lack of funds for eating disorder research relative to disorders of similar prevalence lack of clarity regarding what agencies should fund eating disorder research. 5E.g., individuals in larger bodies experience economic discrimination. 6E.g., males, specific ethnicities. 7Especially when occurring during childhood or chronically 6,8Suggests different ethnicities may have different levels of acceptance around weight that impact distress frequency and treatment seeking. 9E.g., being forced to run in gym class and ridiculed by peers. 10“There’s that trauma of [the belief that] ‘taking care of myself [is] bad and selfish, and I shouldn’t do that.,’ and even if they can’t verbalize that [view], it’s there,” (P37). 11or resulting mood regulation disturbances. 12Adverse childhood experiences that are often overlooked and under-screened, but that potentially relate to adult eating disorder pathology. 13E.g., poor communication skills or social interaction abilities. 14E.g., systemic discrimination and stigmatization. 15Two participants made statements about negative relationships between interpersonal factors and BED pathology AND about positive relationships between social interaction and BED pathology. 16Outside of social media and social messaging. 17Primarily by reinforcing ideals around body weight/shape/ size, food, eating, and fitness that contribute to social ranking, social interactions, and self-esteem/valuation/negative affect. 18Three separate areas of research demonstrate that: a) malnutrition can occur in individuals with larger bodies, b) malnutrition can lead to food preoccupation 63; and c) maternal malnutrition is linked to offspring obesity (e.g., Although the participant mis-referenced Aamodt, 2016 64 – which cites Tripicchio *et al*., 2014 65 – Parlee *et al.* 66 note the Dutch famine study found gestational maternal malnutrition increases odds of offspring adult obesity (Ravelli et al., 1976, 1998, 1999 in Parlee *et al.,* 2014) and animal studies find maternal nutrient-or protein deficiency causes adult offspring obesity (see citations 57–78 in Parlee *et al.*, 2014) 66. 19E.g., food and nutrition insecurity and poverty 67. 20E.g., hiring engineers to design foods that produce specific rewarding or emotional responses and promote consumption, potentially leading to over-consumption and binge eating. 21E.g., informing individuals with binge eating disorder of the nature of “hyper-engineered foods” and food industry practices to provide a full picture of “[the foods and industries] they’re dealing with,” (P16). 22Including need for more funding (equally proportionate to that available for research on other disorders of similar magnitude) and need for clarification on which funding agencies should fund eating disorder research. 23E.g., structural racism and sexism, economic exploitation (see statements from P16 in section A), and “broader sociocultural issues.” 24“What do we do then to reach these [marginalized] communities in a way that's meaningful?”  **Table Abbreviations:** **ACEs**, adverse childhood experiences; **BED**, binge eating disorder; **COVID-19**, Coronavirus-19; **NIDDK**, National Institute of Diabetes and Digestive and Kidney Diseases; **NIH**, National Institute of Health; **NIMH**, National Institute of Mental Health. | | |

### Primary Data Transformation

The themes and subthemes identified in Bray et al., 2022 and shown in Table 1 were transformed into correlation matrices, along with the number and percent of participants who endorsed each theme, and whether participants described themes/subthemes as having positive (+1), or negative (-1), or no/neutral (0) associations with one another, as described in Lamicchane et al., 2025 and in Supplemental Material S2.36

### Network Mapping

Two different network mapping software and techniques – Kumu (<https://kumu.io/>, CA, USA) and Python (<https://github.com/makism/dyconnmap>)68,69 – were used for network map visualization an analysis, as described in Lamicchane et al., 2025 and below (and in greater detail in **Supplemental Material S2**).36

#### Kumu

Kumu’s secure web-based visualization platform (<https://kumu.io/>, CA, USA) was used to organize data into relationship maps for greater data visualization and analysis, as described in Lamichhane et al. (2025) and Biddell et al (2022).36,70 Briefly, These were then entered into Kumu as mapping entities, integrating principles of social network mapping and concept mapping. The strength of each theme was determined using the number and percent of participants who endorsed the theme, as reported in Bray et al. (2022) and represented by the thematic circle thickness (diameter) within the network map (with greater circle diameter representing higher theme and subtheme endorsement. Themes and sub-themes with higher endorsement percentages were positioned more centrally in the network map, while those with lower percentages of endorsement were positioned more peripherally. See **Supplemental Material S2** for additional detail.

#### Python

Python mapping (<https://github.com/makism/dyconnmap>) was used for network map visualization an analysis, as described in Lamichhane et al. (2025) and here. Briefly, Chat GPT.com 71 was used to generate code for the network mapping, including data preparation, network initialization, edge creation, visualization parameters, graph layout, and display. Microsoft Excel (Microsoft Corporation, <https://www.microsoft.com/en-us/microsoft-365/excel>) 72 and Google Sheets (Google LLC, <https://www.google.com/sheets/about/>) 73 were used to create a heat-map-styled correlation matrix, with primary themes identified in the original data (Bray et al., 2022) populated horizontally into row 1 and vertically into column 1. Binary coding was used to code for the presence (+1/-1) or absence (0) of relationships between horizontal/row and vertical/column elements (themes). The **Python Pandas Library** 74,75 was imported to load and read the correlation matrix files. The **Python NetworkX Library** 76 was used to transform the correlation matrix data into a network map, integrating principles of social network mapping and concept mapping. The Python NetworkX library **‘graph()’** function was used to initialize the network structure, with data frame rows and columns defined as primary themes identified in the original data (Bray et al., 2022). These were used to define the main elements/actors in the network map, with each actor representing an individual node in the network list, thus depicting how each node (primary theme identified in Bray et al., 2022) are connected and interact with each other. The NetworkX Library’s **‘nx.draw()’** function was used to set visual parameters for the network map appearance (including node, edge, and font definition, position, size, color). A **spring\_layout algorithm** was used to ensure visuo-spacial optimization76 and Matplotlib library’s HSV function was used to assign unique colors to each node. TheMatplotlib Library’s **plt.show() function** was used to display the network map as an open figure **(Figure 2)**. Additional details can be found in the **Supplemental Material S2.**

# Results

## Original (Primary) Data

All fourteen experts (14/14, 100%) responded to the domain question asking participants to describe their perspectives or knowledge on literature and research, current clinical guidelines, and their own personal (professional) experiences relating to current CIH treatment interventions utilized and/or considered for clinical care and treatment of adult BED.

## Network Mapping

The Kumu and Python network maps (Figure 1, Figure 2) visually represented the relationships between themes identified in Bray et al., 2022. The maps highlight the centrality of themes such as invalidation and invalidating environments, systemic issues and systems of oppression, and marginalized and under-represented populations. Peripheral themes include predatory food industry practices and nutrition insecurity/scarcity, which had lower endorsement percentages and were positioned more towards the edges of the map. More importantly, the maps highlight the complex interconnected of these various environmental factor themes and subthemes.

\*\*\*MORE HERE?\*\*\*

## Figure 1: Social Network Mapping Using Kumu’s Online Platform

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Figure 1: Kumu Network Map of Environmental Factors Experts in the Field Associated with Binge Eating Disorder in Bray et al., 2022. Kumu’s secure web-based visualization platform (<https://kumu.io/>, CA, USA) was used to organize primary data from Bray et al., 2022 into relationship maps to visualize and analyze the data. The themes identified in Bray et al., 2022 – and the number and percent of participants who endorsed each theme – were entered into Kamu as mapping entities, with each theme (entity) representing an individual circle on the primary map. The strength of each theme was determined using the number and percent of participants who endorsed the theme, as reported in Bray et al., 2022. This was represented by the thematic circle thickness (diameter) on the map. Thicker circles with larger diameters represent higher percentage of participant endorsement of a specific theme or subtheme. The network map visually represents the relationships between themes identified in Bray et al., 2022. The map highlights the centrality of themes such as invalidation and invalidating environments, systemic issues and systems of oppression, and marginalized and under-represented populations. These themes are positioned at the center of the map, indicating their high endorsement percentages and central role in the network of environmental factors contributing to binge eating disorder. Peripheral themes include predatory food industry practices and nutrition insecurity/scarcity, which have lower endorsement percentages and are positioned more towards the edges of the map.

HEAT MAP??

## Figure: 2 Social Network Mapping using Python Programming

A diagram of a network

Description automatically generated

Figure 2: Python Network Map of Environmental Factors Experts in the Field Associated with Binge Eating Disorder in Bray et al., 2022.

Python mapping (<https://github.com/makism/dyconnmap>) was used to organize themes and subthemes identified in Bray et al., 2022 into a correlation matrix used for network map visualization and analysis. Primary themes and subthemes identified in the original data (Bray et al., 2022) were populated horizontally and vertically into a heat-map-styled correlation matrix. Binary coding was used to code for the presence (1) or absence (0) of relationships between horizontal/row and vertical/column elements (themes). The Python NetworkX library 76 was imported to create and visualize the network map. The ‘graph()’ function was used to initialize the network structure, and the ‘nx.draw()’ function was used to set visual parameters for the network map appearance (including node, edge, and font definition, position, size, color). The matrix-based data from the CSV file was transformed into a network map using the Python NetworkX library, integrating principles of social network mapping and concept mapping. Each entity (e.g., each primary theme identified in Bray et al., 2022) was represented by a different colored icon in the map to enable effective element visualization. The strength of each theme was determined using the number and percent of participants who endorsed the theme, as reported in Bray et al., 2022. This was represented by the thematic circle thickness (diameter) on the map. Thicker circles with larger diameters represent higher percentage of participant endorsement of a specific theme or subtheme. Themes/elements with higher endorsement percentages were positioned at the center of the network map, while those with lower percentages were positioned more peripherally. The network map visually represents the relationships between themes identified in Bray et al., 2022. The map highlights the centrality of themes such as invalidation and invalidating environments, systemic issues and systems of oppression, and marginalized and under-represented populations. These themes are positioned at the center of the map, indicating their high endorsement percentages and central role in the network of environmental factors contributing to binge eating disorder. Peripheral themes include predatory food industry practices and nutrition insecurity/scarcity, which have lower endorsement percentages and are positioned more towards the edges of the map. This map allows for more detailed customization of visual parameters, providing a more tailored and precise representation of the network.

# Discussion

This study explored the use of two different network mapping software and techniques – Kumu and Python – to develop network mapping protocols that provide visual representations of qualitative data analysis findings. The application of these protocols to a previous qualitative analysis (Bray et al., 2022) demonstrated their real-world utility and provided a side-by-side comparison of their strengths and limitations.

## Novelty and Innovation

The novelty of this study lies in its application of network mapping tools, traditionally used in fields like neuroscience and public health, to qualitative data analysis in social science and psychology. This innovative approach enhances the visualization and understanding of complex relationships between themes, offering a new method for qualitative researchers to present their findings.

The potential for innovation to the field should not be minimized, particularly in regard to the field of qualitative analysis. The application of network mapping to qualitative data has potential to add a layer of objective statistical modeling that can (a) enable visual data representation, (b) support greater scientific rigor, and (c) enable exploration of the often-complex ways a variety of real-life variables interact with one another, which cannot otherwise be done (well) verbally.

We have developed two new network mapping protocols that can be applied to qualitative data analysis findings. In the context of this publication, this method can be further explored to identify ways in which the environmental factors identified in Bray et al., 2022 interact with one another and the ways these different factors may be used to identify populations of individuals that are particularly vulnerable to binge eating disorder. A better understanding of how these factors interact can also help guide public policy priorities and needs around some of these systemic issues (e.g., food insecurity) and different approaches that may be warranted for preventing and treatment BED in relation to these issues (which are largely overlooked in standard of care interventions like cognitive behavioral therapy). More broadly, this protocol has potential to revolutionize (and at least advance) qualitative data analysis by applying a layer of objective statistical modeling that (a) enables visual data representation, (b) supports greater scientific rigor, and (c) enables exploration of the often-complex ways a variety of real-life variables interact with one another, which cannot otherwise be done (well) verbally.

## Relevance of Findings to the Literature

The network map clusters identified in this study support literature findings suggesting that the environmental factors identified in Bray et al., 2022 often intersect and interact in a variety of complex ways that often disproportionately impact specific vulnerable populations.1,21,3-35 For example, factor/node clusters centered around the primary theme of marginalized and under-resourced populations in Figure 1 and Figure 2 align with findings cited in Bray et al (2022) and elsewhere that suggest racial, ethnic, sexual, and trans/nonbinary gender minorities (and other marginalized populations) are ***more*** likely to experience:

1. Discrimination;1,4-12
2. Stigmatization;1,10,13-17
3. Unemployment, homelessness, and poverty;1,18,19
4. Food insecurity;1,20-22
5. Direct targeting by tobacco-owned food and beverage marketing programs;1,23

and ***less*** likely to

1. Be screened by healthcare providers for an eating disorder;1,3,24-31
2. Included in eating disorder research;1,3,24-31
3. Recognize the need for BED treatment when present;1,3,24-31
4. Pursue, access, or engage in treatment when needed,1,3,24-31

due to a variety of complex issues.1,3

The network maps produced here provide a visual representation of the speculations that certain factors may cluster together, exponentially increasing risk for BED, specifically among individuals whose race, ethnicity, sex, gender, socioeconomic status, ability, neurodivergence, trauma and adversity, age, religion, and other identities are historically minimized, marginalized, under-resourced, under-represented, invalidated, unvoiced, overlooked, and/or misunderstood in research, clinically, and socioculturally.1-3,38 Moreover, our network maps add to the existing literature by providing a visual representation of how these factors relate to- and impact each other and BED (according to the way they are described in Bray et al., 2022).

The factor/node clustering in Figure 1 and Figure 2 also support a possibility proposed in the literature that factor clustering may exponentially increasing risk for BED (e.g., specifically among individuals whose race, ethnicity, sex, gender, socioeconomic status, ability, neurodivergence, trauma and adversity, age, religion, and other identities are historically minimized, marginalized-, under-resourced, under-represented, invalidated, unvoiced, overlooked, and/or misunderstood in research, clinically, and socioculturally).1-3,38 However, inferential tests for covariance, correlation and regression are warranted for formal confirmation.

The factor clusters identified here also align with a growing literature base that endorses the existence of different phenotypical expressions of BED and of the need for more tailored treatment approaches that can match client heterogeneity,2,77-80 as has been done successfully in other disorders.81

For example, Bray et al. (2023) report 19 different possible BED subsets or phenotypes that were spontaneously endorsed by more than one BED expert.2 These outlined in Table \*\*\* below, along with empirical support.

### Table 2. BED Subsets or Phenotypes Spontaneously Endorsed by Experts in the Field, as Published in Bray et al., 2023

| **Table 2. Binge Eating Disorder Subsets or Phenotypes Spontaneously Endorsed by Experts in the Field, as Published in Bray et al., 2023** | | |
| --- | --- | --- |
| **Environmental Factors Identified by BED Experts** | **Expert Endorsement**  **n (n/14)** | **Empirical Support** |
| “Food/eating addiction” or reward-based phenotypes A | 4 (29%) |  |
| Trauma, adversity, or PTSD-like factors present and predominant | 4 (29%) |  |
| ADD/ADHD-like presentations B | 3 (21%) |  |
| Chronic dieting/restriction-mediated | 3 (21%) |  |
| Obsession and/or compulsion around food and/or eating C | 3 (21%) |  |
| Hyper-sensitivity (to taste, facial cues, or social threat) | 2 (14%) |  |
| Mood or emotion dysregulation-driven | 2 (14%) |  |
| Childhood/developmental environment factor | 1 (7%) |  |
| Comorbid night eating syndrome | 1 (7%) |  |
| Depression-mediated | 1 (7%) |  |
| Economic/socio-economic status | 1 (7%) |  |
| General cognitive deficits/sequential issues D | 1 (7%) |  |
| Genetic Factors | 1 (7%) |  |
| Invalidating environments | 1 (7%) |  |
| Learned emotional invalidation | 1 (7%) |  |
| Non-specific gastrointestinal and/or inflammatory issues E | 1 (7%) |  |
| Non-specific personality factors | 1 (7%) |  |
| Motivated by feeling of volume | 1 (7%) |  |
| Social anxiety-driven | 1 (7%) |  |
| **Table 2: Binge Eating Disorder (BED) Subsets or Phenotypes Spontaneously Endorsed by Experts in the Field, as Published in Bray et al., 2023.** In a recent cross-sectional mixed-methods study of BED experts' opinions (Bray et al., 2023), experts spontaneously endorsed a total of 19 different possible subsets or phenotypes of BED. These are shown above in column 1, with expert endorsement (n, and n/14) shown in column 2 and empirical support shown in column 3.  **Table Legend:** Results expressed as n (%), in which percentages are n/14 times 100. **Table Footnotes:** (A) “Food/eating addiction” or reward-based phenotypes were described as being driven by mechanisms implicit in substance-related and addictive disorders (e.g., hedonic/reward-based symptoms). (B) ADD/ADHD-like presentations were described as having issues with “inhibitory control,” “impulsivity,” and “craving” or “reward responsivity”. (C) E.g., obsessively thinking about food or compulsivity around eating food. (C) E.g., obsessively thinking about food or compulsivity around eating food. (D) E.g., difficulties with daily activities of living. (E) ”That group with that funky, inflammatory, GI stuff, pain, eating disorder, depression, anxiety, they have that whole horrible mix, most of them [also] have a trauma history.”  **Table Abbreviations:** **ACE**, adverse childhood experience; **ADD**, attention deficit disorder; **ADHD**, attention deficit hyperactive disorder; **ALE**, adverse lifetime experience; **AN**, anorexia nervosa; **BED**, binge eating disorder; **BN,** bulimia nervosa; **PTSD**, post-traumatic stress disorder. | | |

### Table 3. BED Subsets or Phenotypes Spontaneously Endorsed by Experts in the Field, as Published in Bray et al., 2023

| **Table 3. Binge Eating Disorder Subsets or Phenotypes Spontaneously Endorsed by Experts in the Field, as Published in Bray et al., 2023** | | |
| --- | --- | --- |
| **Environmental Factors Identified by BED Experts** | **Expert Endorsement**  **n (n/14)** | **Empirical Support** |
| 1. Innate coping response to untreated underlying issues | 10 (71%) |  |
| “Food/eating addiction” or reward-based phenotypes A | 4 (29%) |  |
| Trauma, adversity, or PTSD-like factors present and predominant | 4 (29%) |  |
| ADD/ADHD-like presentations B | 3 (21%) |  |
| Chronic dieting/restriction-mediated | 3 (21%) |  |
| Obsession and/or compulsion around food and/or eating C | 3 (21%) |  |
| Hyper-sensitivity (to taste, facial cues, or social threat) | 2 (14%) |  |
| Mood or emotion dysregulation-driven | 2 (14%) |  |
| Childhood/developmental environment factor | 1 (7%) |  |
| Depression-mediated | 1 (7%) |  |
| Economic/socio-economic status | 1 (7%) |  |
| General cognitive deficits/sequential issues D | 1 (7%) |  |
| Invalidating environments | 1 (7%) |  |
| Learned emotional invalidation | 1 (7%) |  |
| Non-specific gastrointestinal and/or inflammatory issues E | 1 (7%) |  |
| Non-specific personality factors | 1 (7%) |  |
| Motivated by feeling of volume | 1 (7%) |  |
| Social anxiety-driven | 1 (7%) |  |
| Genetic Factors | 1 (7%) |  |
| Comorbid night eating syndrome | 1 (7%) |  |
| **Table 2: Binge Eating Disorder (BED) Subsets or Phenotypes Spontaneously Endorsed by Experts in the Field, as Published in Bray et al., 2023.** In a recent cross-sectional mixed-methods study of BED experts' opinions (Bray et al., 2023), experts spontaneously endorsed a total of 19 different possible subsets or phenotypes of BED. These are shown above in column 1, with expert endorsement (n, and n/14) shown in column 2 and empirical support shown in column 3.  **Table Legend:** Results expressed as n (%), in which percentages are n/14 times 100. **Table Footnotes:** (A) “Food/eating addiction” or reward-based phenotypes were described as being driven by mechanisms implicit in substance-related and addictive disorders (e.g., hedonic/reward-based symptoms). (B) ADD/ADHD-like presentations were described as having issues with “inhibitory control,” “impulsivity,” and “craving” or “reward responsivity”. (C) E.g., obsessively thinking about food or compulsivity around eating food. (C) E.g., obsessively thinking about food or compulsivity around eating food. (D) E.g., difficulties with daily activities of living. (E) ”That group with that funky, inflammatory, GI stuff, pain, eating disorder, depression, anxiety, they have that whole horrible mix, most of them [also] have a trauma history.”  **Table Abbreviations:** **ACE**, adverse childhood experience; **ADD**, attention deficit disorder; **ADHD**, attention deficit hyperactive disorder; **ALE**, adverse lifetime experience; **AN**, anorexia nervosa; **BED**, binge eating disorder; **BN,** bulimia nervosa; **PTSD**, post-traumatic stress disorder. | | |

The phenotypical subsets endorsed by >1 expert in Bray et al., 2023 were:2

1. Coping response to untreated mental health comorbidity (e.g., ADD, ADHD, childhood or lifetime adversity (ACEs, ALEs), depression, OCD, other eating disorder (e.g., comorbid night eating syndrome), PTSD. social anxiety, trauma) (
   1. Trauma of living with BED and its underlying psychopathology (n = 8, 57%).
   2. Trauma, adversity, or PTSD-like factors present and predominant (n = 5, 36% endorsement).
   3. Reward dysregulation / untreated food or eating “addictive disorder” (e.g., latent mechanisms implicit in substance-related and addictive disorders (SRADs) and other processes of reward/hedonic dysregulation that go unaddressed or untreated (n = 4, 29% endorsement).
   4. ADD/ADHD-like presentations (e.g., issues with “inhibitory control,” “impulsivity,” and “craving,” or “reward responsivity” that can present similarly to ADD/ADHD) (n= 3, 21% endorsement).
   5. Obsession and/or compulsion around food and/or eating (e.g., obsessively thinking about food or compulsivity around food consumption or binge eating (n = 3, 21% endorsement).
   6. General cognitive deficits/sequential issues (e.g., difficulties with daily activities of living) (n = 1, 7%).
   7. Comorbidity with other eating disorder (e.g., night eating syndrome)(n = 1, 7%).
   8. Depression-mediated (n = 1, 7%).
   9. Social anxiety-driven (n = 1, 7%).
2. Chronic dieting/restriction-mediated (21% endorsement).
3. Hyper-sensitivity (to taste, facial cues, or social threat) (14% endorsement).
4. Mood or emotion dysregulation-driven. (14% endorsement).
5. Com

Additional possible subsets of phenotypes that were spontaneously identified or referenced by only one participant (1/14, 7%) each are included in Supplementary Table S2 and inlcluded.childhood/developmental environment factors, economic/socio-economic status, genetic factors, invalidating environments, learned emotional invalidation, non-specific gastrointestinal and/or inflammatory issues (e.g., “that group with that funky, inflammatory, GI stuff, pain, eating disorder, depression, anxiety, they have that whole horrible mix, most of them [also] have a trauma history,”), non-specific personality factors, and motivated by feeling of volume.

The subsets/phenotypes identified by BED experts in Bray et al (2022) tend to align with the predominant models of BED conceptualization that have empirical support2,77 and underscore the importance of recognizing, accepting, identifying, and classifying heterogeneity in BED is an important step toward matching client heterogeneity to treatment modality.81 and proposed for BED.

Lastly, our findings further support those of Bray et al and others that identify a variety of unique environmental factors that can present as forms of childhood and lifetime adversity, further compounding the role of stress, adversity, and trauma in BED, and identifying a critical need for trauma-and social-justice informed lenses in BED research and treatment interventions1-3,38,78-80,82-91.

\*\*

Here, the network maps created from primary findings presented in Bray et al (2022) significantly support the possibility of several of these proposed phenotypes. For example, emerging literature on childhood and lifetime adversity recognizes that these can include more traditional forms of trauma (e.g., parental or peer neglect, bullying, or abuse that can be physical, verbal, psychological/emotional, or sexual). However, these can also include less “traditional” forms of trauma and adversity that can include all of the environmental factors identified in Bray et al., 2022:

1. Invalidation and invalidating environments.
2. Systemic issues and systems of oppression.
3. Marginalized and under-represented populations.
4. Economic precarity.
5. Stigmatization and its psychological impacts.
6. Trauma and adversity.
7. Food insecurity/scarcity.
8. Interpersonal factors and relationships.
9. Social messaging and social media.
10. Nutrition insecurity/scarcity.
11. Predatory food industry practices.
12. Research/clinical gaps and directives (e.g., healthcare stigmatization, misconceptions in research and clinically; the “SWAG” misconception that ascribes eating disorders exclusively to “thin (skinny), white, affluent young women (girls)” and leave ~95% folks with BED (who generally do not fall into that demographic) invalidated, un-detected, under-screened, undiagnosed, untreated, and left to suffer in silence).

\*\*\*

**3.2. Stress-Induced Binge Eating Disorder in Humans**

A variety of literature associates stress exposure and cortisol dysregulation with the development, maintenance, and relapse of binge eating behaviors and binge eating disorder 92. First, a large area of work focuses on the relationships between stress/cortisol and binge-type use of alcohol, drugs, sex, and gambling that include binge-type consumption of food 92-101.

A variety of epidemiological and clinical studies demonstrate that childhood and lifetime adversity, and aversive stimuli can produce craving (in humans) and binge-type consumption (in humans and rodents).

Review and add in all of Naish et al 2019 here (below) 92

***3.2.1. Childhood and Lifetime Adversity, Abuse, Trauma, & PTSD in BED***

A variety of epidemiological and clinical studies demonstrate that childhood and lifetime adversity, including physical, emotional, and sexual abuse, neglect, trauma, and stigmatization, discrimination, oppression, and economic precarity, food insecurity, and nutrition scarcity precede and predict binge eating development and maintenance often 79,80. For example, epidemiological studies consistently find ~21 – 25% lifetime prevalence rates of PTSD among men and women with known binge eating (Dansky et al., 1997; Mitchell et al., 2012), which is more than twice the 9.4% lifetime prevalence rate of PTSD among the general American adult population (Kilpatrick et al., 2013). Binge eating disorder experts consistently identify childhood and lifetime adversity as a salient environmental risk factor for binge eating disorder, including invalidating environments, marginalization, discrimination, stigmatization, economic precarity, food insecurity, nutrition scarcity, interpersonal relationship deficits and isolation, and more traditional forms of trauma (e.g., adverse childhood experiences, adverse lifetime experiences, domestic or local violence, physical, sexual, emotional abuse, and neglect) 1. A 2015 systematic review of 70 clinical studies addressing relationships between adverse life experiences or post-traumatic stress disorder (PTSD) and obesity or binge eating disorder found that 87% of studied identified ALEs as a risk factor for obesity and BED and 90% of studies supported associations between trauma and the development of binge eating disorder in adulthood 79.

***3.2.2. Clinical Studies***

Clinical studies further demonstrate that stress exposure and cortisol levels are significantly correlated with the development, maintenance, and relapse of binge eating behaviors.

First, a large area of research demonstrates that stress and negative affect often precede a binge episode in humans and rodent models of binge eating (import these into EndNote and add them here: Heatherton & Baumeister, 1991; Womble, Williamson, Greenway, & Redmann, 2001(Greeno et al., 2000; Le Grange et al., 2001; Munsch, Meyer, Quartier, & Wilhelm, 2012) Haedt-Matt & Keel, 2011102-104 as well as in drug use [citations]. Negative affect is also consistently associated with eating and binge eating disorder development and maintenance (Hilbert et al., 2007; Stice, 2002; Stice, Presnell, & Spangler, 2002)104 and with more severe eating pathology (Gianini, White, & Masheb, 2013; Grilo & White, 2011; Whiteside et al., 2007)104. Moreover, the relationship between negative affect and binge eating or binge eating disorder tends to be not just correlated but causative in many studies, with negative emotion and affect shown to “trigger” or prompt binge eating that can catalyze, crystalize, and/or worsen BED pathology (Chua, Touyz, & Hill, 2004; Greeno et al., 2000; Haedt-Matt & Keel, 2011; Masheb & Grilo, 2006; Stein et al., 2007; Zeeck et al., 2011)(Leehr et al., 2015)104.

Robust findings also demonstrate the ability of stress exposure to change food choices, facilitating a preference for more highly palatable, salient, and processed foods (e.g., M&M candies, sweet high-fat snack foods and a more energy-dense meal) over whole foods (e.g., grapes, fruits, vegetables, and less energy-dense snacks and meals) 105-107. This distinction is important as a variety of literature also demonstrates a greater ability for highly palatable, salient, and processed foods to elicit binge-type eating patterns in rodents and humans 97[add more citations]. Together, these findings suggest that stress exposure may hold the power to tip food choices toward foods that are known to elicit binge eating.

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Clinical studies also consistently find that cortisol responses to psychological and physiological stress exposure tend to be enhanced in individuals with binge eating disorder (Klatzkin,Ganey, Cyrus, Bigus, & Brownley, 2015)104, as do symptoms associated with depression, anxiety, and negative affect (Grilo et al., 2008; Zeeck, Stelzer, Linster, Joos, & Hartmann, 2011) 104.

The enhanced cortisol stress responses are associated with stress-induced eating and binge eating 102,103. Gluck et al (2004) found that women with binge eating disorder had enhanced cortisol responses to stress (cold exposure) relative to healthy controls that were accompanied by enhanced self-reports of hunger and craving (desire to binge) during and after stress exposure relative to healthy controls 103. Epel et al (2001) found that acute stress exposure produced enhanced cortisol stress responses and binge eating behavior in clinical populations of women with eating disorders as compared to those behavior observed in healthy controls (in which eating behavior did not change after stress exposure relative to that observed on control (non-stress exposure) days 102.

Additionally, Pool et al (2015) demonstrated that acute stress exposure (cold stress) not only resulted in increased blood cortisol levels but also increased the amount of work (mobilized effort in instrumental action) that participants engaged in to access a pleasurable stimulus (chocolate odor), despite no change in their ratings of the amount of pleasure associated with experiencing the stimuli 113. These findings (conducted in a sample of 36 adult men and women who reported liking chocolate) suggest that stress can selectively increases cue-triggered wanting, independently of the hedonic properties of the reward 113. These findings also suggest as a cortisol as a mechanism that enables stress to enhance craving and thus increase vulnerability for the development, maintenance, and relapse of binge eating disorder and drug use alike. Importantly, these were the first *human* findings to be conducted using models aimed to mirror a broad variety of animal studies that also consistently find stress exposure and cortisol stress responses to produce cue-triggered bursts of binge eating, relapses in drug addiction, and/or gambling (in humans and rodents) (see citations in Pool et al., 2015).

Lyu and Jackson (2016) added to these findings by exploring the impacts of acute stress exposure (cold pressor test) on neurobiological and behavioral responses to palatable food cures, as observed using functional magnetic resonance imaging (fMRI) in a sample of BED-symptomatic females 114. Lyu and Jackson found that in females with BED symptoms, stress exposure resulted in reduced brain cell activity in response to food cue exposure (e.g., reduced deoxyhemoglobin concentrations and blood oxygen level dependent (BOLD) activity) in the inferior frontal gyrus (IFG), insula, and hippocampus relative to activity observed in a non-BED control group in these regions 114. Moreover, the reduced hippocampal activity was associated with greater chocolate consumption in the lab after fMRI 114.

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It is likely that experiencing more than one factor exponentially increases the risk for developing binge eating disorder, specifically among racial, ethnic, and sexual minorities. However, more research is warranted to identify the extent to which these separate environmental factors interact among specific populations of individuals, and the nature of their relationship with binge eating disorder (**Table 1**).

Additionally, while network mapping tools have been widely used in other fields, their application to qualitative data analysis in social science and psychology is relatively novel. This study builds on existing literature by demonstrating the utility of these tools in visualizing complex qualitative data, providing a new perspective on how qualitative findings can be represented and analyzed.

## Implications

The findings of this study have important implications for clinical practice and research. Specifically, the network maps created in this study can help highlight the complex ways environmental factors associated with BED are often related to one another and can compound in specific clusters that can exponentially increase risk and odds for BED1,2. 1,3-35

The clusters identified in these network maps can also help identify distinct phenotypical expressions of BED that differ from one another and may similarly warrant (and require) treatment approaches that also differ distinctly from one another and can address the specific factors most salient to each specific phenotype. These possibilities (of different phenotypical expressions of BED and of the need for more tailored treatment approaches that can address different aspects of different phenotypes more specifically) have been proposed by Bray et al., 2023 and others in the literature.2,78-80

For example, Bray et al. (2023) report 19 different possible BED subsets or phenotypes that were spontaneously endorsed by more than one BED expert and identified as themes during qualitative analysis of BED experts’ anonymously recorded semi-structured interview transcripts.2

The possible phenotypical subsets recognized as themes (spontaneously endorsed by BED experts) in Bray et al., 20232 were:

1. Trauma, adversity, or PTSD-like factors present and predominant (29% endorsement).
2. “Food/eating addiction” or reward-based phenotype (e.g., driven by mechanisms implicit in substance-related and addictive disorders (SRADs) and other processes of reward/hedonic dysregulation (29% endorsement).
3. ADD/ADHD-like presentations (e.g., issues with “inhibitory control,” “impulsivity,” and “craving,” or “reward responsivity” that can present similarly to ADD/ADHD) (21% endorsement).
4. Chronic dieting/restriction-mediated 3 (21% endorsement)
5. Obsession and/or compulsion around food and/or eating (e.g., obsessively thinking about food or compulsivity around food consumption or binge eating (21% endorsement).
6. Hyper-sensitivity (to taste, facial cues, or social threat) 2 (14% endorsement).
7. Mood or emotion dysregulation-driven 2 (14% endorsement).

Additional possible subsets of phenotypes that were spontaneously identified or referenced by only one participant (1/14, 7%) each are included in Supplementary Table S4.1 of Bray et al., 2023.

The subsets/phenotypes identified by BED experts in Bray et al (2022) tend to align with the predominant models of BED conceptualization that have empirical support 2,77

Recognizing, accepting, identifying, and classifying heterogeneity in binge eating disorder is an important step toward matching client heterogeneity to treatment modality, as has been done successfully in other disorders 81 and propsed for BED.

Here, the network maps created from primary findings presented in Bray et al (2022) significantly support the possibility of several of these proposed phenotypes. For example, emerging literature on childhood and lifetime adversity recognizes that these can include more traditional forms of trauma (e.g., parental or peer neglect, bullying, or abuse that can be physical, verbal, psychological/emotional, or sexual). However, these can also include less “traditional” forms of trauma and adversity that can include all of the environmental factors identified in Bray et al., 2022:

1. Invalidation and invalidating environments.
2. Systemic issues and systems of oppression.
3. Marginalized and under-represented populations.
4. Economic precarity.
5. Stigmatization and its psychological impacts.
6. Trauma and adversity.
7. Food insecurity/scarcity.
8. Interpersonal factors and relationships.
9. Social messaging and social media.
10. Nutrition insecurity/scarcity.
11. Predatory food industry practices.
12. Research/clinical gaps and directives (e.g., healthcare stigmatization, misconceptions in research and clinically; the “SWAG” misconception that ascribes eating disorders exclusively to “thin (skinny), white, affluent young women (girls)” and leave ~95% folks with BED (who generally do not fall into that demographic) invalidated, un-detected, under-screened, undiagnosed, untreated, and left to suffer in silence).

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**3.2. Stress-Induced Binge Eating Disorder in Humans**

A variety of literature associates stress exposure and cortisol dysregulation with the development, maintenance, and relapse of binge eating behaviors and binge eating disorder 92. First, a large area of work focuses on the relationships between stress/cortisol and binge-type use of alcohol, drugs, sex, and gambling that include binge-type consumption of food 92-101.

A variety of epidemiological and clinical studies demonstrate that childhood and lifetime adversity, and aversive stimuli can produce craving (in humans) and binge-type consumption (in humans and rodents).

Review and add in all of Naish et al 2019 here (below) 92

***3.2.1. Childhood and Lifetime Adversity, Abuse, Trauma, & PTSD in BED***

A variety of epidemiological and clinical studies demonstrate that childhood and lifetime adversity, including physical, emotional, and sexual abuse, neglect, trauma, and stigmatization, discrimination, oppression, and economic precarity, food insecurity, and nutrition scarcity precede and predict binge eating development and maintenance often 79,80. For example, epidemiological studies consistently find ~21 – 25% lifetime prevalence rates of PTSD among men and women with known binge eating (Dansky et al., 1997; Mitchell et al., 2012), which is more than twice the 9.4% lifetime prevalence rate of PTSD among the general American adult population (Kilpatrick et al., 2013). Binge eating disorder experts consistently identify childhood and lifetime adversity as a salient environmental risk factor for binge eating disorder, including invalidating environments, marginalization, discrimination, stigmatization, economic precarity, food insecurity, nutrition scarcity, interpersonal relationship deficits and isolation, and more traditional forms of trauma (e.g., adverse childhood experiences, adverse lifetime experiences, domestic or local violence, physical, sexual, emotional abuse, and neglect) 1. A 2015 systematic review of 70 clinical studies addressing relationships between adverse life experiences or post-traumatic stress disorder (PTSD) and obesity or binge eating disorder found that 87% of studied identified ALEs as a risk factor for obesity and BED and 90% of studies supported associations between trauma and the development of binge eating disorder in adulthood 79.

***3.2.2. Clinical Studies***

Clinical studies further demonstrate that stress exposure and cortisol levels are significantly correlated with the development, maintenance, and relapse of binge eating behaviors.

First, a large area of research demonstrates that stress and negative affect often precede a binge episode in humans and rodent models of binge eating (import these into EndNote and add them here: Heatherton & Baumeister, 1991; Womble, Williamson, Greenway, & Redmann, 2001(Greeno et al., 2000; Le Grange et al., 2001; Munsch, Meyer, Quartier, & Wilhelm, 2012) Haedt-Matt & Keel, 2011102-104 as well as in drug use [citations]. Negative affect is also consistently associated with eating and binge eating disorder development and maintenance (Hilbert et al., 2007; Stice, 2002; Stice, Presnell, & Spangler, 2002)104 and with more severe eating pathology (Gianini, White, & Masheb, 2013; Grilo & White, 2011; Whiteside et al., 2007)104. Moreover, the relationship between negative affect and binge eating or binge eating disorder tends to be not just correlated but causative in many studies, with negative emotion and affect shown to “trigger” or prompt binge eating that can catalyze, crystalize, and/or worsen BED pathology (Chua, Touyz, & Hill, 2004; Greeno et al., 2000; Haedt-Matt & Keel, 2011; Masheb & Grilo, 2006; Stein et al., 2007; Zeeck et al., 2011)(Leehr et al., 2015)104.

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Additionally, the use of network mapping approaches can enhance the visualization and analysis of qualitative data, providing a more comprehensive understanding of complex relationships between themes *and* a means for communicating a large amount of complex data through one or two succinct infographics. This approach can better enable translation and use of qualitative data findings to more quantitative-driven fields, including clinical and public health and policy. For example, in the case of the original data used in this study (Bray et al., 2022), the network maps can be used to inform the development of targeted interventions and policies to address the environmental factors contributing to binge eating disorder.

## Study Limitations and Strengths

This study has several limitations and strengths that should be considered when interpreting the findings. One limitation is the reliance on previously published qualitative data, which may not capture all relevant themes or relationships. Additionally, the use of binary coding for relationships between themes in the Python application may oversimplify the complexity of these relationships. Another limitation is the potential for bias in the secondary analysis and interpretation of the data.

However, this study also has several strengths. The use of two different network mapping approaches (Kumu and Python) allows for a comprehensive comparison of their utility and effectiveness in visualizing qualitative data. The application of these tools to a real-world dataset demonstrated their practical relevance and potential for enhancing qualitative data analysis. Furthermore, the study highlights the importance of visualizing complex relationships between themes, which can inform future research and practice.

Additionally, a major strength of this study (as addressed above) is its potential for innovation to the field of qualitative analysis. The application of network mapping to qualitative data has potential to add a layer of objective statistical modeling that can (a) enable visual data representation, (b) support greater scientific rigor, and (c) enable exploration of the often-complex ways a variety of real-life variables interact with one another, which cannot otherwise be done (well) verbally.

Lastly, the strengths and limitations addressed in the primary study (Bray et al., 2022) apply to the primary data used in this study as well. First, the primary data’s original study sample size (n = 14) is appropriate for a mixed-methods analysis of this nature 1,2,38,115-119 but limits the ability to generalize the data’s themes and conclusions to the field of BED researchers and clinicians at large. Thus, findings from this study are not necessarily generalizable. Second, the primary data collection and analysis methods were qualitative and subjective, which may introduce biases or errors in interpreting or presenting the data. Therefore, these findings may not be replicable or verifiable by other researchers or methods. Third, the original data study design was cross-sectional and did not include formal expert analysis of causal relationships between factors (through follow-up surveys or other means). Therefore, our findings may not be conclusive or definitive about the nature or mechanisms of treatment barriers for BED.

Fourth, we did not directly ask participants about their views on the themes identified in the primary data. Again, this would be done through follow-up surveys, focus groups, or Delphi Panel forums. Thus, the themes identified in this work have not been verified by the experts themselves. A follow-up questionnaire or Delphi Panel is warranted to gather their direct responses. Fifth, there are several important limitations in the demographics of the experts interviewed in this study. For example, although this study’s sample provides an accurate demographic representation of ED experts (92% White, 100% not Hispanic or Latino), it does not accurately represent the demographic profile of individuals who experience adult BED, which has higher rates of Hispanics, Latinos and Blacks, Indigenous, and Peoples of Color 30,31,120. The demographic discrepancies between those who study and treat adult BED and those who experience it are not insignificant. These discrepancies highlight the importance of including marginalized populations in academic and clinical training opportunities for adult BED research and care, and of emphasizing community- and narrative-based approaches to research. Additionally, one of the study’s four possible eligibility criteria for researchers (NIH R01 grant funding; see **Table 1**) presents a bias for including participants from the US. There were three other eligibility criteria researchers could meet to be included that were not dependent on any nationality and the final study sample does include participants from the UK, AU, and CA as well as from the US. Nevertheless, it would have been optimal to include criteria for funding from other federal agencies. Environmental factors associated with BED may vary regionally, and it is possible our findings are skewed to place greater emphasis on the treatment barriers specific to the geographic locations of the experts we interviewed. Finally, this study collected demographic data on sex assigned at birth but not gender. This oversight is important because gender is demographically relevant, whereas sex assigned at birth is not relevant to this study question. Further, asking for sex assigned at birth follows an old convention that fails to account for equity and diversity inclusion.

Despite these limitations, the primary data study has some strengths that should be recognized. First, our study addressed a novel and important topic that has received little attention in the literature: treatment access barriers for BED from the perspectives of experts. Therefore, our study contributes to filling a gap in the knowledge base and advancing the field of BED research.

Additionally, the primary data study used rigorous and transparent methods to collect and analyze the data. For example, this study’s systematic inclusion criteria (**Table 1)** provide a strong population representation of experts who drive the field. This includes researchers with the greatest funding and publication output (recently and historically) and clinicians with high clinical and academic affiliations, as well as those most likely to be accessed by individuals with BED themselves (e.g., most commonly identified through a Google search or popular press books on BED). As a result, the primary data study sample includes a well-rounded balance of BED experts, including researchers, medical doctors, licensed therapists, and dietitians, as well as intuitive eating specialists, healthcare administrators, and public health advocates (**Table 3**). Although one of the four possible inclusion criteria for researchers involves NIH funding, this criterion was not required (researchers were required to meet one of the four possible criteria). Thus, while this criterion presents a bias for the inclusion of academics within the US, the study sample does include a balanced geographic representation, with individuals across the US as well as in the UK, AU, and CA. The study’s use of semi-structured interviews (**Table 2**), reflexive thematic analysis, and network mapping further ensure the rigor and transparency of the methodological approach, thus validating the quality and credibility of the data and findings. Finally, the primary data study generated rich and detailed data that captured the complexity and diversity of the experts’ experiences and opinions on treatment barriers. Therefore, our study provides a comprehensive and nuanced understanding of current challenges and opportunities in BED treatment.

## Conclusions

In conclusion, this study explored the current barriers to treatment access for adult BED from the perspectives of expert researchers, clinicians, and healthcare administrators. We identified several patient-, provider-, and systems-level barriers that can prevent BED detection, diagnosis, treatment-seeking, and treatment engagement. Addressing these barriers requires a concerted effort from healthcare providers, policymakers, and researchers. By reducing internal and external obstacles, improving education, and expanding affordable treatment options, we can enhance the prospects for individuals affected by BED to receive the care they need and improve their mental health outcomes.

We also developed a theoretical model of how these barriers can interact and influence each other at different stages of the treatment process. Our findings have implications for research, practice, and policy in the BED field. We suggest that more education and awareness campaigns, more tools that can simplify screening, treatment-seeking and access, more accessible and affordable treatment options, and more supportive and empathic care are needed to improve the identification, referral, and treatment engagement of individuals with BED. We also recommend that future studies further investigate the experiences of individuals with BED (in general and in relation to treatment barriers), identify how to best integrate multi-disciplinary approaches and teams, examine the effectiveness of peer mentorship programs, and secure more funding for BED research.

In conclusion, the use of network mapping approaches in this study provided valuable visual representations of the relationships between themes identified in Bray et al., 2022. The Kumu and Python network maps highlighted the centrality of key themes and the interconnectedness of environmental factors contributing to binge eating disorder. The choice between Kumu and Python may depend on the specific needs and technical expertise of the user. Future research should continue to explore the use of network mapping tools and techniques

# Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

# Author Contributions

Conceptualization, R.L. and B.B.; methodology, R.L., B.B., R.T.; visual network mapping, R.L.; secondary data analysis used to determine relationship between themes and subthemes: BB, RL, investigation, R.L., B.B., and R.T.; resources, B.B.; data curation, R.L., B.B.; writing – original draft preparation, B.B., R.T., R.L.; writing – review and editing, B.B., R.T., R.L., C.B., H.Z., and R.B.; supervision, B.B.; project administration, B.B. All authors agree to be accountable for the content of the work.

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