4-28-2023

An Examination of the Association Between Microaggression and Select Disordered Eating Behaviors Within the Transgender and Non-Binary Community

Dee Murray
dm6933@rit.edu

AN EXAMINATION OF THE ASSOCIATION BETWEEN MICROAGGRESSION AND SELECT DISORDERED EATING BEHAVIORS WITHIN THE TRANSGENDER AND NON-BINARY COMMUNITY

A THESIS IN

Health and Well-being Management

Presented to the Faculty of the Rochester Institute of Technology in partial fulfilment of the degree

MASTER OF SCIENCE IN HEALTH AND WELL-BEING MANAGEMENT

By

DEE MURRAY

Wegmans School of Health and Nutrition

College of Health Sciences and Technology

Rochester Institute of Technology

Rochester, New York
April 28, 2023

Thesis Committee Chair: Dr. Barbara Lohse

Thesis Committee Members: Dr. Elizabeth Ruder, Dr. Alan Smerbeck

ACKNOWLEDGEMENTS

I want to express my sincere appreciation to Dr. Barbara Lohse, my thesis committee advisor, for her unwavering support and guidance throughout my research. Her profound knowledge of nutrition and expertise in research has been tremendously instrumental in assisting me during every stage of my thesis preparation: from my literature review, to formulating my methods, and helping analyze data results.

I would also like to thank the other members of my thesis committee, Dr. Elizabeth Ruder and Dr. Alan Smerbeck. During my graduate studies, Dr. Ruder contributed to my understanding of community health perspectives; her insights helped underscore the need for research centered on the health of gender minorities. Dr. Smerbeck has been one of my professors for both my undergraduate and graduate education. He has contributed significantly to my interest in gender studies; his psychology expertise and extensive knowledge of gender minorities were essential and invaluable for my thesis.

I also extend my heartfelt gratitude to my family (mom, pops, and brother) for their unending support throughout the completion of my thesis. Lastly, I want to thank my better half, Ryan, for being my constant source of encouragement and my emotional sounding board throughout the highs and lows of completing my research.

I am immensely grateful for the opportunity to pursue my graduate education at RIT, under the Wegmans School of Health and Nutrition. I eagerly anticipate what the future has in store for me.

TABLE OF CONTENTS

ABSTRACT

Background: Microaggressions experienced by transgender and non-binary (TNB) individuals differ from those experienced by non-TNB individuals. Limited research has explored the association between TNB-focused microaggression and disordered eating behaviors.

Methods: An online survey consisting of validated instruments was administered to respondents (N=194) over a 96-day period. The instruments included the Satter Eating Competence Inventory (ecSI 2.0^{TM}), Three Factor Eating Questionnaire (TFEQ-18), Cohen's Perceived Stress Scale (PSS-14), and the Transgender Discrimination Scale (TDS-21). Associations between characteristics were assessed with the Pearson correlation coefficient.

Results: Microaggression was positively associated with negative eating behaviors such as cognitive restraint ($r= 0.41$; $p<0.001$) and uncontrolled eating ($r=0.26$; $p=0.01$), and perceived stress ($r=0.31$; $p=0.002$). TNB perceived stress was negatively associated with eating competence ($r= -0.33$; $p=0.001$). While uncontrolled eating was positively associated with emotional eating ($r=0.71$; $p<0.001$) and cognitive restraint ($r=0.34$; $p<0.001$). Microaggression differed significantly among gender identity groups ($p=0.02$), with transgender men reporting a higher experience of microaggression compared to non-binary individuals (55.2 ± 19.6 vs. 42.2 ± 14.6; $p=0.03$).

Conclusion: Microaggression was positively associated with specific eating behaviors known to be congruent with disordered eating. Microaggression was evident in transgender men, transgender women, and non-binary gender identities. A larger and more diverse sample size is suggested for future studies.

INTRODUCTION

Microaggression, subtle yet harmful forms of discrimination, can be verbal (invasive questions, gender pronoun assumption), nonverbal (physical actions/reactions), and/or environmental (lack of representation, access to bathrooms).[1–3] Microaggression affects different groups such as, but are not limited to, women; people of color; individuals with disabilities; individuals belonging to a different social and income class; and the lesbian, gay, bisexual, transgender, and queer (LGBTQ) community. [4,5] Empirical research has indicated that discrimination directed at transgender and non-binary (TNB) individuals adversely affects their well-being more than discrimination experienced by their lesbian and gay peers.[4,5] The physical and psychological well-being of TNB individuals living in the United States have been negatively impacted by discrimination, with a reported decrease of 46% and 66% in their physical and mental health.[6] Consequently, their cisgender counterparts (those who identify as either lesbian, gay, or bisexual) have reported lower experiences with discrimination resulting in a decrease of their physical and mental states by only 32% and 52%, respectively.[6] These statistics underscore how TNB-centric microaggression not only affect the mental and physical health of the TNB community but also help explain how the community, as a whole, encounters hurdles in navigating employment and acquiring gender-affirming care.[4,7,8]

LITERATURE REVIEW

Minority stress model and microaggression

Meyer's minority stress model (MSM), a conceptual framework published in 2003, states that constant discrimination and prejudice fosters a stressful social environment that may cause mental and physiological health problems by members of a stigmatized minority group.[1] Meyer's MSM describes different events and experiences that depict prejudice and discrimination among lesbian, gay, and bisexual (LGB) individuals.[1] The gender minority stress model (GMSM), an adaptation of the MSM, integrates how minority stress factors result in a greater manifestation of psychological and physiological health problems among the TNB community. [9,10] The GMSM classifies microaggression, a form of discrimination, as one of its prime distal (external) stressors.[1,9,10] Distal stressors are external and societal prejudice events, either physical or verbal, aimed towards a specific individual who belongs to a marginalized group.[1,10] These stressful events may include, but are not limited to, bullying, rejection (familial, peer-related, employment-related) and relationship abuse.[1,8,10] Sexual and gender identity expression also play a pivotal role in the prevalence of distal stressors experienced by the TNB community.[7,8,10] Discrimination and microaggression caused by gender (and sexual) identity expression evoke a plethora of hostile environments for the TNB individual.[5,10] These events are chronic, socially-based, and are deep-seated in society's norms and stereotypes pertaining to heteronormativity.[4,5,7,10] These distal stressors are hypothesized to cause internal, proximal stressors such as internalized homophobia or transphobia, or perceived pressure to hide one's sexual or gender identity.[1,4,7,9,10] Coping mechanisms, either positive or negative, to combat these

prejudice events have also been considered to increase the amount of stress, albeit its proximal effect, experienced by the TNB individual.[1,2,10]

Disordered eating behaviors in the transgender and non-binary community

Exposure to distinctive events of microaggression cause different mental and physiological health issues to affect the TNB community.[4,5,7] One physiological health concern that has been studied to affect the TNB community is the prevalence of disordered eating behaviors (DEB).[7,11] Disordered eating describes a range of irregular, unhealthy eating behaviors that do not necessarily confer a diagnosis of an eating disorder.[12,13] These eating behaviors also do not often exhibit the classical symptoms that indicate an eating disorder.[12,13] Some notable examples of disordered eating include, but are not limited to, frequent dieting; skipping meals; fluctuating weight; rituals/routines pertaining to food intake and exercise; feelings of guilt/shame associated with eating; body image and/or body size preoccupation; mild fasting and/or purging.[12] Health concerns brought about by disordered eating range from physiological issues (greater risk for obesity, bone loss, low blood pressure and low heart rate) to mental issues (anxiety and depression).[12,13] While these health issues occur because of the lack of understanding and realization of how these unhealthy behaviors impact the TNB individual on a larger and temporal scale, prejudice and stress stemming from microaggression also serve as important catalysts for disordered eating behaviors to proliferate within the community.[2,7,13] The prevalence of disordered eating behaviors among the TNB community in the recent decade was reported in a study done in 2015.[7,14] Among nearly 290,000 cisgender and transgender participants from 233 universities in the US, 13.5% of TNB respondents have reported using diet pills compared to only 4.29% of the cisgender respondents.[14] The study also reported that 15.1%

of the TNB participants have used laxatives and practiced self-induced vomiting compared to 3.71% of cisgender participants.[14] There have also been reports of disordered eating behaviors being utilized by TNB individuals who have experienced issues in accessing gender affirmative care and treatment.[13] These individuals are most likely without healthcare insurance, lack parental consent (for adolescent TNB individuals) to start hormone replacement therapy, are financially constrained, and/or have not been referred to a health care provider in a timely manner.[13]

Eating competence, cognitive restraint, and disordered eating behaviors

Eating competence can be defined as "being positive, comfortable, and flexible with eating as well as matter-of-fact and reliable about getting enough to eat of enjoyable and nourishing food".[15,16] Individuals who are eating competent exhibit positive eating behaviors, such as recognizing hunger and fullness cues to determine how much food to eat, taking time in eating food that is enjoyable and comfortable enough to eat, and cultivating positive attitudes geared towards seeking food instead of avoiding it.[15] Eating competence and disordered eating are associated. Individuals who are eating competent tend to exhibit lower levels of body dissatisfaction, less emphasis on weight control, and lower psychosocial characteristics associated with disordered eating.[16]

The relationship between eating competence and disordered eating can be further understood by examining responses to the Three Factor Eating Questionnaire (TFEQ).[17] The TFEQ is a psychometric measure widely used in eating behavior research and has three factors that correspond to uncontrolled eating, emotional eating, and cognitive restraint.[17] Uncontrolled eating is an inclination to consume excessive amounts of food without being in control.[17,18]

Emotional eating is the propensity to consume food in response to emotional cues.[17,19] Cognitive restraint is the conscious behavior of restricting food intake instead of relying on hunger (and satiety) cues to regulate food consumption, i.e. "control over food intake in order to influence body weight and body shape."[17] In the context of disordered eating behaviors, it is important to acknowledge that cognitive restraint is separate and different from dieting.[17,19] Although both behaviors involve a certain degree of conscious control over food consumption, dieting is usually short-term and intended for the purpose of achieving healthy weight loss.[19,20] Consequently, cognitive restraint is characterized by a chronic pattern of self-imposed food restriction with frequent monitoring of food intake.[17,20] For example, cognitive restraint may include negative behaviors that severely limits food consumption.[20] It may also involve engaging in behaviors that compensate the consumption of too much food such as fasting, overexercising, and many others.[19,20]

Gender dysphoria and disordered eating behaviors

Gender dysphoria (GD), a cognitive unease associated with the incompatibility between an individual's gender identity and their gender assigned at birth, is considered to be a risk factor in the manifestation of disordered eating behaviors for TNB individuals.[7,13,21] Gender dysphoria can make a TNB individual feel uncomfortable or distressed with their physical appearance, particularly upon onset of secondary sex characteristics.[11,21] This leads to body dissatisfaction; which is one of the risk factors for DEBs.[21–23] TNB individuals may also feel the pressure of conforming to heteronormative societal standards and expectations of beauty and gender; including the pressure to maintain a certain body size or shape.[21,22] The stress of coping to heteronormative standards may lead to body checking and body image avoidance and can

increase the risk of negative eating behaviors.[21–24] Transgender and non-binary youths were more likely to engage in unhealthy behaviors pertaining to body weight control compared to cisgender youths.[14] The TNB youths with higher levels of gender dysphoria were more likely to engage in these types of negative behaviors.[14]

Gender affirming care may initially pose a risk for DEBs and eating disorders, albeit minimal in its effect.[11,21,25] Hormone replacement therapy (HRT) has been studied to affect physiological changes in a TNB individual's appetite and/or metabolism.[25] Murray et al found that soon after initiating HRT, transgender and non-binary adults had a higher disposition to DEBs and EDs compared to the general population, though there is no evidence that HRT causes long-term increases in eating problems.[25] Hormone replace therapy induces puberty-like physiological changes; thus it is reasonable to hypothesize that it causes some of the same temporary alterations in body image and eating behavior observed in cisgender puberty.[11,21] The combination of physical, social, and psychological factors is believed to cause disordered eating behaviors, body image checking and avoidance, and body dissatisfaction within the TNB community.[7,11,21] Transgender and non-binary are hypothesized to resort to disordered eating behaviors to help with body shape and size manipulation so that they may feel more aligned with the gender they most identify with.[13]

The current study

Research geared towards the transgender and non-binary community is slowly gaining momentum. To date, the association between TNB-centric microaggression and disordered eating behaviors has not been fully explored. The primary aim of this study is to examine the associations between microaggression and disordered eating habits of the transgender and non-

binary community. The researcher hypothesizes that there is an association between microaggression and disordered eating behaviors; Another hypothesis is these associations are mediated by stress. Finally, this study will examine whether the experience of microaggressions and disordered eating behaviors differ between transgender men, transgender women, and non-binary individuals.

METHODOLOGY

Study design

A cross-sectional survey study design was used for this research.

Recruitment

Three recruitment methods were employed for the study. The first recruitment method was taken from secondary analysis of data collected from the About Eating New York (AENY) study, IRB# 01032822. Data from AENY included emails of individuals who identified as TNB and were willing to be contacted for future research. These individuals were sent an email that contained information regarding the scope of the study and a link to participate in the research (Appendix A).

The second recruitment method allowed for the selection of participants by posting a social media flier in TNB and LGBT Facebook and Discord groups that are based in New York State (Facebook.com, Menlo Park, CA; Discord.com, San Francisco, CA). The social media flier (Appendix B) contained a link and a Quick Response (QR) code for interested participants to either click on or scan using their mobile phone cameras to be included in the study. This social media strategy also invited the use of snowball sampling through posting on personal Facebook pages.

The third recruitment method utilized a Rochester Institute of Technology (RIT) Department of Psychology Research Participation System, known as Sona. Following approval by the Sona administrator, the TNB health study was added to a list of other different studies in the Sona recruitment website. RIT students looking to participate in research through the Sona

system, primarily undergraduates enrolled in psychology classes, were allowed to sign up for the study.

Inclusion and exclusion of participants

Eligibility criteria included being 18 years or older, a resident of New York State, and identifying as a TNB individual. Initial recruitment invited transgender, non-binary, and gender non-conforming people to participate. The term transgender includes anyone whose gender identity does not match their gender assigned at birth. Non-binary is an umbrella term for all gender identities other than male or female, including agender, two spirit, etc. Because non-binary identities are not assigned to babies at birth, non-binary people fit in the transgender category, though they may not choose to identify with that term. Gender non-conforming refers to gender expression, not gender identity, and describes those who persistently choose a gender expression inconsistent with their gender identity, such as a cisgender man who wears dresses. No cisgender respondents who were gender non-conforming enrolled in the study; all participants were transgender and/or non-binary. Thus, all hypotheses and analyses are about the transgender/non-binary population. No inferences will be made about gender non-conforming people. To facilitate examination of disordered eating behaviors, without skewing from eating disorders, interested persons who were medically diagnosed with an eating disorder were excluded.

Instruments

Four validated instruments gathered data. A question pertinent to worry about money for food was also included for the study (Appendix E).

Transgender Discrimination Scale. The Transgender Discrimination Scale (TDS-21) is a 21-item self-report measure of the experiences of transgender and non-binary individuals with discrimination in the past year.[26] It assesses five subtypes of discrimination including microaggression and harassment, restricted career and work opportunities, bullying and harassment in educational settings, harassment by law enforcement, and maltreatment in health care.[26] After reflecting on personal experiences involving discrimination, each participant rates the frequency of each item based on a Likert scale with 1 = never to 6 = almost all of the time.[26] A total score of 126 may be obtained; higher scores indicate greater transgender-associated discrimination.[26] The TDS-21, a measure of discrimination, was used as a proxy for microaggression.

Eating Competence Inventory. The Eating Competence Inventory (ecSI 2.0™) is a 16-item measure of eating competence, defined by the Satter Eating Competence Model (ecSatter) as "being positive, comfortable, and flexible with eating as well as matter-of-fact and reliable about getting enough to eat of enjoyable and nourishing food.[15,16,27] Each item has 5 response options (Always, Often, Sometimes, Rarely, Never) scored from 0 (Rarely, Never) to 3 (Always).[16] A total score of 48 may be achieved.[16] Possible scores range from 0 to 48 with higher scores indicating greater eating competence; scores that are ≥ 32 indicate an eating competent respondent.[16]

Three Factor Eating Questionnaire. The Three Factor Eating Questionnaire (TFEQ-R18) consists of 18-items that measure disordered eating behavior.[18] It includes three scales: cognitive

restraint (CR) defined as the "control over food intake in order to influence body weight and body shape", emotional eating (EE) defined as "the tendency to eat in response to negative emotions", and uncontrolled eating (UE) defined as "the tendency to overeat, with the feeling of being out of control". Six items denote level of cognitive restraint; three refer to emotional eating and nine items address uncontrolled eating behaviors.[18] Responses to the questionnaire used a four-point response scale (definitely true, mostly true, mostly false, definitely false) ranging from one to four.[18] For each subscale, scores were summed and transformed to a percentage ranging from 0 to 100.[18] Higher scores indicate a greater level of the disordered eating behavior for each scale.[18]

Cohen Perceived Stress Survey. The 14-item Cohen Perceived Stress Survey (PSS-14) assesses the degree to which respondents have experienced their life circumstances as unpredictable, overwhelming, distressing, and uncontrollable over the past month.[28] A 4-point scale is used from 0 (never) to 4 (very often), with half of the items reverse-scored.[28] A total of 56 points may be achieved.[28] Higher scores denote higher perceived stress.[28]

Worry about Money for Food. As food insecurity can independently cause irregular eating behaviors, a validated question regarding the amount of worry about money for food (WAM) was included to assess information related to food insecurity without adding to the length of the survey and subject burden. This question has been shown to correlate with the longer and more detailed US Adult Food Security Survey and the Expanded Food and Nutrition Education Program (EFNEP) questions that referenced food security.[27] The question is coded on a 5-point response scale ranging from never=1 to always=5 such that higher scores equated to greater worry about money for food.[27]

Data collection and procedure

Data were collected using an online survey (Appendix D) that was developed using Qualtrics (Qualtrics, Provo UT).[29] Agreement to an online consent form was required prior to participation in the study. Data collection for the first and second recruitment method began on November 29, 2022. The third recruitment method began its data collection on January 17, 2023. All three recruitment methods ended March 5, 2023.

Interested participants from all 3 recruitment methods selected a link to the web-based survey platform. From there, if the participant agrees to participate upon reading and reviewing the study's consent form, they clicked "next" to begin the study. Participants were given the option to choose one or more gender identities they most aligned with from a list provided in the survey. Gender identities and expressions listed include transman, transwoman, gender non-conforming, gender queer, agender, non-binary, two-spirit, cisgender. They were also provided an option to indicate any gender identities that were not included in the list (Appendix D). After going through inclusion checks (such as gender identity, state of residency, absent diagnosis of an eating disorder, and age eligibility), the participants were then re-directed to the assessment portion of the survey which included measuring their eating competency, eating behaviors, worry about money for food, discriminatory experiences, and perceived stress.

Participant incentives

Eligible participants, recruited via the first and second methods, who provided an email address at the end of the survey, were entered in a drawing to win one of three $35.00 gift cards to make a purchase on Amazon.com. All student participants recruited via the Sona website were incentivized by credit toward class participation.

Data analysis

Demographic information (age, ethnicity, gender identity) was summarized by using measures of central tendency to determine sample characteristics. For all continuous variables, normality was analyzed using skewness and kurtosis values. Absolute values of 0 to 1 were considered to approximate normality. In addition, quantile-quantile plots that had a linear appearance were indicative of a normal distribution. All instruments were scored according to their directions and summarized by using descriptive statistics. TDS-21 scores were compared with ecSI 2.0^{TM}, TFEQ-18, WAM, and PSS-14 test scores using Pearson's Correlation coefficient *(r)*. Partial correlation was used to determine associations between all valid instruments after controlling for age and worry about money for food. Mean scores for age and WAM experienced by different TNB identity groups were compared using ANOVA. The general linear model (GLM) was used to explore significant relationships between each of the validated measures when controlling for either age or WAM. Gender identities were also reclassified into a dichotomy: binary transgender (consisting of transgender men and transgender women) and non-binary. Findings between the two groups were analyzed using GLM univariate analysis controlling for age and WAM. Version 28.0.0.0 (190) of the IBM SPSS software was used to analyze the data.[30] Significance was set at alpha level $p<0.05$.

RESULTS

Description of participants

Of 194 that accessed the survey link, 103 completed the survey. Participants were mostly under 35 years old and predominantly white. A variety of gender identities were reported with 37% transmen, 38% transwomen, and the remaining identifying as non-binary (reporting as either gender non-conforming, gender queer, agender, non-binary, and/or two-spirit). Majority of the participants experienced high levels of discrimination and stress and were not eating competent. Moreover, 63% of the total number of respondents indicated that they either sometimes, rarely, or never worry about money for food. Descriptive details are in Table 1.

Relationships among gender identity, age, and worry about money for food

Gender identity groups were significantly different by age ($p=0.008$) and worry about money for food ($p=0.048$). Transgender women ($n=39$) were significantly older compared to non-binary respondents ($n=26$; 39.2 ± 14.1 vs 28.9 ± 10.2; $p=0.008$); transgender men ($n=38$) tended to worry more about money for food compared to non-binary participants ($n=26$; 3.2 ± 1.3 vs 2.4 ± 1.2; $p=0.05$). Thus, age and WAM were retained as co-variates.

Relationships among eating behavior, demographic, and psychosocial factors

Eating competence, measured by the ecSI 2.0™, was inversely related to stress ($r= -0.33$; $p=0.001$). The three scales of the TFEQ, cognitive restraint, uncontrolled eating, and emotional eating, were related to each other. Uncontrolled eating was associated with both cognitive restraint ($r=0.34$; $p<0.001$) and emotional eating ($r=0.71$; $p<0.001$), indicating that participants

who may have difficulty controlling their food intake are more likely to both intend to may either restrict what they consume to control their body weight/shape and are more likely to eat in response to emotional cues.

Stress was associated with worrying about money for food ($r=0.23$; $p=0.03$) suggesting that individuals with higher stress scores may also have elevated concerns about their ability to purchase food because of financial constraints. Stress was also positively associated with discrimination ($r=0.31$; $p=0.03$), indicating that participants who were discriminated more experienced higher levels of stress.

Discrimination scores were associated with eating behaviors and psychosocial factors. Discrimination was positively associated with two of the three TFEQ subscales, including cognitive restraint ($r=0.41$; $p<0.001$), uncontrolled eating ($r=0.26$; $p=0.01$); and worry about money for food ($r=0.37$; $p<0.001$). Participants who perceived more discrimination either consciously restricted their food intake to control their body weight, tended to consume more food without the ability to control their food intake, or had higher levels of financially-related worry about food.

All above relationships were zero-order correlations and were rerun as partial correlations, once controlling for age and again while controlling for worry about money for food. All significant correlations remained significant.

Table 1. Description of participant characteristics (*n*=103).

Demographic Characteristics	n (%)
Gender identity[1] (n=103)	
Transgender men	38 (36.9)
Transgender women	39 (37.9)
Non-binary[2]	26 (25.2)
Age (n=105)	
< 25 years	28 (26.7)
25 - 34 years	35 (33.3)
35 - 54 years	28 (26.7)
> 54	14 (13.3)
Race/Ethnicity (n=106)	
White (Non-Hispanic)	91 (85.8)
Black or African American	5 (4.7)
Hispanic or Latino	1 (0.9)
Asian	6 (5.7)
Native American	3 (2.8)
Hawaiian Native or Pacific Islander	0
Alaskan Native	0
Discrimination[3], mean [SD; range]	50.0 [19.01; 21 - 116]
< 38	31 (31.6)
38 - 56	33 (33.7)
> 56	34 (34.7)
Stress, mean [SD; range]	29.9 [8.9; 6 - 54]
Low Stress	5 (5.2)
Moderate Stress	24 (24.7)
High Stress	68 (70.1)
Worry about Money for Food, mean [SD; range]	2.85 [1.3; 1 - 5]
Never	23 (23.5)
Rarely	13 (13.3)
Sometimes	32 (32.7)
Often	16 (16.3)
Always	14 (14.3)

[1] Gender identity was categorized into three groups: transgender men, transgender women, non-binary.
[2] Non-binary identity consisted of different gender identities provided in the survey: gender non-conforming, gender queer, agender, non-binary (enby), two-spirit, and other identities not listed. Participants chose one or more from the identities provided.
[3] Discrimination was measured as a proxy for microaggression.

Table 2. Associations between the different instruments used for the study.[1]

Instruments	Zero Order Correlation		Partial Correlation controlling for Age		Partial Correlation controlling for Worry about money for food	
	r	*p*	*r*	*p*	*r*	*p*
Transgender Discrimination Scale						
TFEQ Cognitive Restraint	0.41	**<.001**	0.46	**<.001**	0.38	**<0.001**
TFEQ Uncontrolled Eating	0.26	**0.01**	0.26	**0.01**	0.23	**0.02**
Perceived Stress	0.31	**0.002**	0.31	**0.003**	0.25	**0.01**
Perceived Stress						
Eating Competence (ecSI 2.0^{TM})	-0.33	**0.001**	-0.31	**0.002**	-0.32	**0.002**

[1] Table entries are Pearson's Correlation Coefficient *r* and significance levels; *p* values <0.05 are significant.

Eating behaviors results

Eating competence scores were significantly different among low, moderate, and high perceived stress levels (p=0.01), with participants reporting low stress levels (n=5; 35.4 ± 9.0) having higher eating competence scores than those reporting high stress levels (n=68; 25.0 ± 9.7; p=0.07). However, eating competence did not differ among gender identities even when controlling for stress, age, or worry about money for food. Eating competence and stress were also not significantly different with the reclassified gender identity (dichotomous) groups even after controlling for age or WAM. See Table 3 for a summary of differences among gender identity groups.

Cognitive restraint was significantly different among gender identities (p=0.002). Non-binary respondents (n=26; 12.6 ± 3.8) had significantly lower cognitive restraint than transgender men (n=38; 15.3 ± 3.6; p=0.01) and transgender women (n=35; 15.5 ± 3.9; p=0.01). Differences in cognitive restraint among gender identities (p=0.02) persisted when controlling for age.

Marginal mean scores for cognitive restraint were different between non-binary (n=26; 12.4 ± 3.8) and either transmen (n=38; 15.3 ± 3.6; p=0.01) or transwomen (n=35; 15.5 ± 3.9; p=0.01). Cognitive restraint also remained significantly different among gender identities (p=0.005) when controlling for level of worry about money for food. Transgender men (n=38; 15.3 ± 3.6; p=0.01) and transgender women (n=34; 15.7 ± 3.9; p=0.002) continued to have higher mean cognitive restraint scores than non-binary participants (n=26; 12.4 ± 3.8). Moreover, cognitive restraint was also significantly different between dichotomized gender identities (p=0.01). Non-binary participants (n=26; 12.4 ± 3.8) had lower mean cognitive restraint scores than binary transgender participants (n=72; 15.5 ± 3.7; p=0.01). However, these group differences did not continue to be significant when controlling for either age or worry about money for food.

Uncontrolled eating was not significantly different among gender identities when controlling for age or worry about money for food. Uncontrolled eating and emotional eating continued to not differ between the non-binary and combined transgender groups even after controlling for WAM or age.

Perceived microaggression (discrimination) results

The relationships between discrimination and gender identity, stress, eating behaviors, age, and worry about money for food were also investigated. Discrimination was not significantly different between age groups. Mean discrimination scores differed by level of worry about money for food (p=0.004). Post hoc tests revealed that participants who never worried about money for food experienced less discrimination (n=22; 38.1 ± 13.2) than those who often (n=16; 58.1 ± 23.3; p=0.03) or always worried about money for food (n=14; 58.4 ± 24.2; p=0.03). Discrimination levels differed (p=0.01) among low, moderate, and high stress

levels with less discrimination for low-stress participants (n=5; 27.4 ± 7.7) than highly stressed (n=68; 53.0 ± 19.4; p=0.01). Discrimination levels reported by participants with moderate stress levels (n=24; 45.9 ± 16.2) did not differ from those reported by participants with either low or high stress levels.

Discrimination experience differed among gender identities (p=0.02). Transgender men reported more discrimination (n=38; 55.2 ± 19.6) than non-binary participants (n=26; 42.2 ± 14.6; p=0.03). Differences in discrimination among gender identities (p=0.01) also persisted when controlling for age. Discrimination scores were different between non-binary (n=26; 42.2 ± 14.6) and either transmen (n=38; 55.2 ± 19.6; p=0.003) or transwomen (n=34; 50.2 ± 19.8; p=0.04). However, discrimination was not significantly different among gender identities when controlling by level of worry about money for food. Discrimination experience did not differ between non-binary and combined transgender groups even after controlling for WAM or age.

Table 3. Differences in age, worry about money for food, cognitive restraint, and discrimination among three gender identities.

Characteristics	n	Mean	SD	Range		*p*
				Min	Max	
Age						**0.01**
Transman	38	35.4	13.1	21	60	
Transwoman	39	39.2	14.1	21	70	
Nonbinary	26	28.9	10.2	21	60	
Transman vs Non-binary						0.14
Transwoman vs Non-binary						**0.01**
Transman vs Transwoman						0.42
Worry about Money for Food[1]						**0.048**
Transman	38	3.2	1.3	1	5	
Transwoman	34	2.9	1.4	1	5	
Nonbinary	26	2.4	1.2	1	5	
Transman vs Non-binary					-	**0.01**
Transwoman vs Non-binary						0.23
Transman vs Transwoman						0.42
Cognitive Restraint[2]						**0.002**
Transman	38	15.3	3.6	6	21	
Transwoman	35	15..5	3.9	8	21	
Nonbinary	26	12.4	3.8	6	18	
Transman vs Non-binary						**0.01**
Transwoman vs Non-binary						**0.01**
Transman vs Transwoman						0.96
Discrimination[3]						**0.02**
Transman	38	55.2	19.6	22	116	
Transwoman	34	50.2	19.8	22	113	
Nonbinary	26	42.2	14.6	21	81	
Transman vs Non-binary						**0.03**
Transwoman vs Non-binary						0.25
Transman vs Transwoman						0.52

[1] Worry about money for food scores can range from 1 (never) to 5 (always). Higher scores denote more worry about money for food.
[2] Cognitive restraint scores can range from 0 to 24 with higher scores denoting greater behavior level.
[3] Discrimination was measured as a proxy for microaggression.

Table 4. Discrimination[1] differences among levels of worry about money for food and perceived stress.

Characteristics	n	Mean	SD	Range		*p*
				Min	Max	
Worry about Money for Food[2]						**0.004**
Never	22	38.1	13.2	21	66	
Rarely	13	48	21.1	22	99	
Sometimes	32	50.6	12.3	28	81	
Often	16	58.1	23.3	29	116	
Always	14	58.4	24.2	24	113	
Perceived Stress[3]						**0.01**
Low Stress	5	27.4	7.7	22	41	
Moderate Stress	24	45.9	16.2	22	80	
High Stress	68	53	19.4	21	116	
Low to Moderate Stress						0.13
Low to High Stress						**0.01**
Moderate to High Stress						0.27

[1] Discrimination was measured as a proxy for microaggression.
[2] Worry about money for food scores can range from 1 (never) to 5 (always). Higher scores denote more worry about money for food. WAM scores were compared with discrimination scores.
[2] Perceived stress can range from 0 to 56 with higher scores denoting greater perceived stress levels. Perceived stress scores were compared with discrimination scores.

DISCUSSION

This study is one of the few to look at the association between disordered eating and microaggression faced by the transgender and non-binary community. Findings suggest a relationship between microaggression with stress, cognitive restraint, uncontrolled eating, and worry about money for food. As microaggression (discrimination) towards TNB individuals increases, their perceived stress, and level of worry about money for food also significantly increase, leading to increased problems with cognitive restraint and overeating. Transgender men experience more instances of microaggression than non-binary individuals. Furthermore, the results support the hypothesis of an association between microaggression (discrimination) and disordered eating behaviors, specifically with cognitive restraint and uncontrolled eating.

The LGBTQ community experience discrimination in various domains such as social interactions, employment, healthcare, and many others.[8,31,32] Subsequently, several studies have noted that the impact of discrimination in this gender and sexually diverse community is more pronounced among its TNB members.[7,31,32] Results of this study contribute to current empirical research that suggests transgender and non-binary individuals encounter unique forms of discrimination exclusive to their community. Consistent with the findings, various instances of discrimination experienced by TNB individuals are associated with difficulties in their eating behaviors.[6,13,31,33]

The study's mean discrimination scores (50.0 ± 19.0) were comparable to the mean discrimination scores of TNB individuals reported by Watson et al who conducted research to develop a self-report measure that evaluates the experiences of discrimination faced by TNB individuals in various domains such as employment, law enforcement, education, healthcare and

other social settings.[26] Similar to Bradford et al. that examined TNB individuals and their experiences of discrimination and its impact on health, this study also reported transgender men having higher mean scores for discrimination compared to non-binary respondents.[34] However, this study's findings contrast with Jaggi et al. who found gender-related discrimination to be higher in non-binary participants than in transgender men in their research pertaining to the relationship between gender minority stress and depressive symptoms among TNB individuals.[9] More research is needed to determine why findings on this question disagree. Discrimination can vary among different gender identities and can be influenced by various factors.[31,34] One possible reason why transgender men may face more discrimination is that their gender identity may prove to be a challenge to traditional societal concepts of masculinity.[9,24] Society may view transgender men as less masculine/manly, leading to a decrease in being recognized as men. In contrast, non-binary individuals may experience less discrimination, possibly because of a lack of visibility and representation.[7] While a lack of visibility is itself a stressor,[7] it may serve as a social cushion against discrimination. However, non-binary individuals still experience discrimination significantly based on their non-conformity to binary gender standards.[7]

Many of our respondents were younger adults; a substantial percentage were recruited from a pool of university undergraduates. Younger respondents, especially undergraduates, are unlikely to worry about money for food, owing to their access to university dining plans or living with family. These younger, college-enrolled participants were much more likely to be non-binary than transgender men or women. This may help explain why transgender men (and possibly transgender women) – predominantly older and not attending school – were more likely to report worrying about money for food. Considering that these older respondents may live independently, be financially constrained, or lack employment, they may be concerned about

being unable to afford food daily; having to make ends meet may lead to the stress of worrying about how and where to purchase food.

Eating competence and stress were inversely correlated. Eating competence refers to an individual's relationship with food, often characterized by either flexible eating behaviors or positive attitudes.[16] Eating-competent individuals are less likely to engage in negative eating behaviors, have healthier eating patterns, and have a positive relationship with food.[16,35] High levels of stress may weaken a person's ability to manage their own behavior and cope effectively with life's demands.

More participants reported high stress levels (Table 1) which is positively associated with transgender-related discrimination (Table 2). Thus, TNB people experience high levels of discrimination, which causes high levels of stress, which diminishes eating competence. This change could occur directly (stress impairs eating competence) or indirectly, via food security (discrimination and stress are associated with poverty and food insecurity, which impairs eating competence). Prior research by Linsenmeyer et al. regarding distinct nutrition considerations of adult transgender individuals has found diminished eating competence in the TNB community, specifically transgender men. The study's mean eating competence score confirms these prior findings.[36] Moreover, the mean eating competence scores among gender identities in the study was below 32, the score that considers an individual to be eating competent, suggesting that our participants encounter difficulties towards their behavior around eating and meal planning.
In a study of the potential of perceived stress as to be a predictor for obesity for LGBT individuals by Warren et al., no significant prediction was found for stress on obesity or eating behaviors.[37] However, that study focused specifically on minority stress, while this study

examined stress more broadly, using the PSS-14. Discrimination can have indirect effects and directly asking only about specific microaggression events may fail to capture the full picture.

Finally, cognitive restraint and uncontrolled eating tended to affect more transgender men and transgender women respondents than non-binary participants. Results pertaining to cognitive restraint and uncontrolled eating were similar to a study that have reported transgender men having a greater risk for high BMI scores compared to transgender women and cisgender participants.[37] Other studies have also reported transgender individuals have higher incidence rates of body dissatisfaction, food restraint (withholding food intake for more than 24 hours), food bingeing, and dissatisfaction with eating habits and weight compared to cisgender individuals.[13,24,33,38–40] Van de Grift et al. found that transgender men and women felt that physical attributes/characteristics that were readily observed (like body figure/size, muscularity, and posture) not only affected how others perceived them but also played an important role in how they felt about their bodies.[11] Their study regarding gender dysphoria and body satisfaction may help explain our findings as to why transgender men, and most likely transgender women, have an elevated tendency to restrict what they eat in order to control their body weight. The dysphoria affecting transgender men and women can be exacerbated by societal expectations around body weight, shape, and size leading to unhealthy eating behaviors managed by their emotional cues.[11,13] However, prior research does not explain why non-binary individuals are relatively unaffected.

Strengths and Limitations

Research on transgender and non-binary studies has increased in recent years because of a growing interest in this topic. However, necessary information in this field is still relatively small compared to other areas of research. Providing representation for gender minorities within the field of nutrition research is one of the primary advantages of this study. By adding to the pool of scientific research done on TNB studies, this study not only helped promote health equity and evidence-based research about transgender experiences but also contributed to social justice by improving attitudes on TNB-related issues.

Another strength of this study was the use of different empirically validated instruments to measured eating behaviors (ecSI 2.0™, TFEQ-18), discrimination (TDS-21), and perceived stress (PSS-14),), as well as the decision to assess transphobic discrimination specifically (e.g., TDS-21) rather than gender-based or LGBTQ+-based discrimination more broadly. Another strength would be the inclusion of a variety of gender identities; many prior studies failed to include non-binary participants or treated all TNB participants as members of a single uniform group. Part of the gender identity verification process in the web-based survey was the inclusion of an option for respondents to specify a gender identity that was not listed, thereby not only emphasizing the concept of gender as a spectrum but also underscoring the idea that gender is not binary.[4,26]

The study has some limitations including limited generalization of findings because only New York State residents were eligible, and the sample consisted of mostly young (less than 35 years) and White non-Hispanic participants. These may not fully show the distinct experiences of TNB individuals who live outside the state, are ethnically and racially diverse, and are older. A prospective area for future research would be to recruit from a more extensive population size

that can tackle a plethora of marginalized gender identities residing in different geographic locations. This recruitment method must also be able to include participants in an older and ethnically inclusive cohort. For example, Black transgender women may have more negative encounters with the police because of being racially profiled as sex workers.[41,42] This may provide different results for the study because of the varied experiences among White non-Hispanic, Black, and other transgender individuals of color. Another limitation is that only some disordered eating behaviors were addressed in the study, namely cognitive restraint, uncontrolled eating, and emotional eating; as well as eating competence. Future studies may expand the breadth of disordered eating behaviors to be considered.

Only categorical information about age was collected and this limited analytical options. Reporting age in groups may create limitations that cannot accurately capture human development and individual differences. Further, this was a cross-sectional study, leaving open the possibility that any age-related differences are cohort effects rather than developmental differences. A longitudinal study that can follow participant discrimination and eating behaviors is recommended for future studies.

Future studies would also benefit from a revised recruitment method. Recruitment was mostly done over the internet, via Facebook and Discord groups. TNB individuals who do not have access to the internet were unable to participate. This limits the generalizability of the study to those who are financially constrained and of a lower socio-economic background. Research studies done online may also run the risk of obtaining compromised data results. Some individuals may have only participated out of an interest in getting the raffle prize. Although the study made sure inclusion checks were in place and allowed participants to enter the raffle by providing their email addresses at the end of the survey (if they were interested), some of the

participants may have either been less attentive, less thoughtful about their survey responses or have provided false answers to the survey questions.

Conclusion

More individuals are identifying as either transgender or non-binary. Health disparities in the TNB community should adequately be addressed by assessing their needs using evidence-based research and by developing appropriate educational and intervention programs catered to the community. This research study revealed associations between TNB-centric microaggression and both negative eating behaviors (such as cognitive restraint, uncontrolled eating) and perceived stress. It also showed differences in discrimination, stress, and eating behaviors between transgender men, transgender women, and non-binary adults. Hopefully, these findings will assist clinicians and healthcare providers in developing better gender-specific programs and creating more gender-affirming standards of care for the TNB community.

Appendix A

Recruitment Email

Recruitment Email

Subject: RIT Transgender Health Study

Hello,

Thank you for your interest in participating in a study about Transgender health!

The goal of this new research study is to understand health behaviors of the transgender and gender non-conforming community living in New York state.

Who can participate in the study?

Transgender and gender non-conforming (TGNC) individuals who:

- are 18 years of age and older
- live in the state of New York

All eligible participants will be entered in a drawing to win an Amazon gift card worth $35.

Are you eligible? Interested in participating? Then, kindly click on this link: https://tinyurl.com/HealthTGNC to proceed to the survey page.

Please let me know if you have any questions about the research study. You can reach me at my email: dm6933@rit.edu for any of your questions and/or concerns.

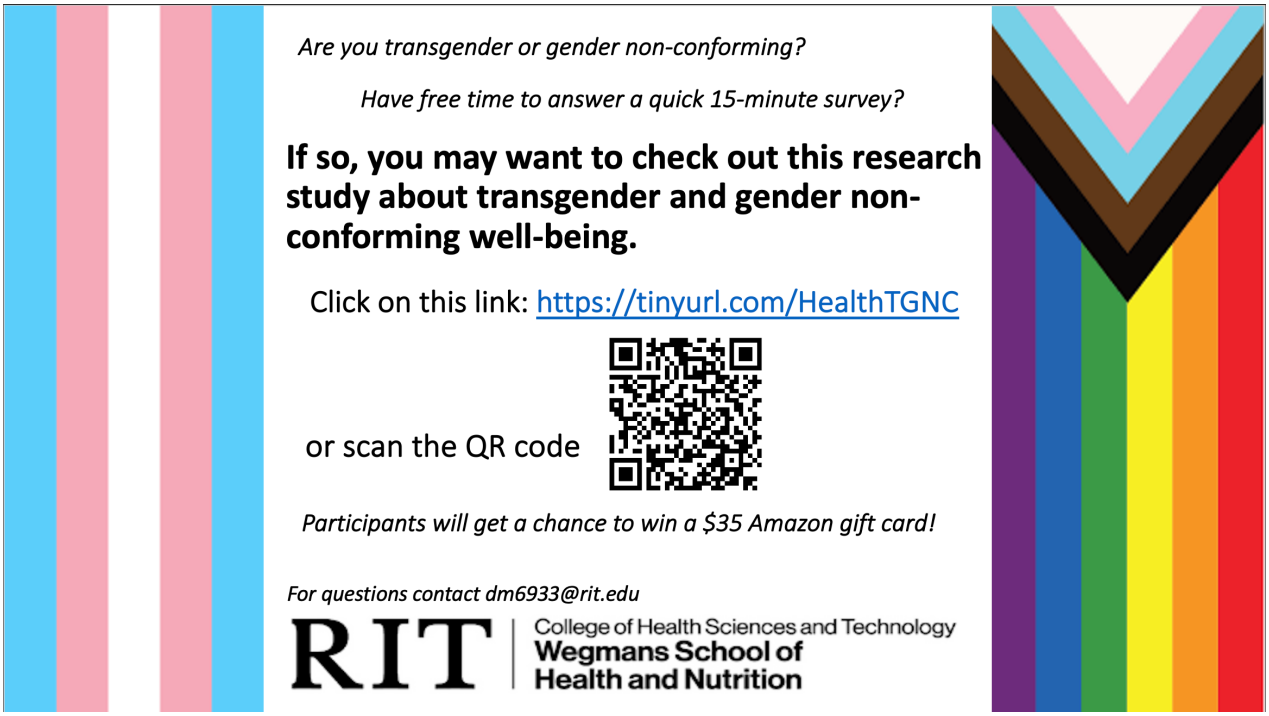
Best,

Dee Murray

Appendix B

Social Media Flyer

Social Media Flyer



Appendix C

Consent Forms

Consent Form for About Eating New York and Main Study Recruitment (Methods 1 and 2)

CONSENT/AUTHORIZATION FOR PARTICIPATION IN THE TRANSGENDER EATING BEHAVIOR AND DISCRIMINATION RESEARCH OPPORTUNITY

Researcher: Dee Murray
Department: Wegmans School of Health and Nutrition Rochester Institute of Technology
Address: 180 Lomb Memorial Drive, Rochester NY 14623
Phone: 585-355-6016
Version Date: November 23, 2022

KEY INFORMATION: You are invited to participate in a research opportunity that studies the experiences of transgender and gender non-conforming individuals involving discrimination. Participation in this research is voluntary. You do not have to participate in the research opportunity if you do not want to. If you decide to participate, you will be tasked to complete a survey accessible online using either a smartphone, tablet, or PC/laptop. The survey is estimated to take approximately 15 minutes in total. Some of the benefits of this research are being able to apply the findings of this research opportunity to ways that can address issues faced by the transgender and gender non-conforming community.

INTRODUCTION: Thank you for your interest in this research opportunity! Kindly read more about the research opportunity below before proceeding. At the bottom of this consent form, please indicate that you understand what the research opportunity is about and you agree to participate in the research opportunity.

PURPOSE: The research aims to get your input regarding your eating behaviors and any forms of discrimination you may have experienced. This research opportunity is conducted by Dee Murray, a graduate student of the Health and Well-Being Management Program, for her graduate thesis completion. The researcher is under the guidance of an advisor, Dr. Barbara Lohse.

WHAT YOU WILL DO AND HOW MUCH TIME IS INVOLVED: You will be asked to complete a survey online; you can access this survey through any smartphone, tablet, or PC/laptop. The survey will ask about your eating habits, different forms of discrimination you have faced, and any perceived stress you may have experienced. Answering the survey questions will take about 10 - 15 minutes. Once you start the survey you must complete it in one sitting.

PAYMENT FOR PARTICIPATION: When you complete the survey, you will be entered into a drawing for a chance to win one of three $35 Amazon gift cards.

RISKS/BENEFITS: There can be a potential minimal psychological risk in terms of a change in your behavior and outlook. Some of the questions regarding discrimination and eating behaviors can be sensitive topics for you. After participation in the study, you might have negative thoughts and emotions when thinking about your eating behaviors and the different forms of discrimination you encounter daily. There may be other risks associated with the research that we are currently not aware of. There is also always the risk of secure data being breached by someone who is not part of the research. One benefit of participating in this research opportunity is learning more about your eating habits and understanding your needs and challenges as a community.

VOLUNTARY PARTICIPATION: If you do not want to answer any questions in the survey, you may skip them. You can also stop the survey at any time. If you decide to stop, there will be no loss to any benefit or resources you are currently receiving. You must agree that you are 18 years of age or older and identify as transgender and/or gender non-conforming

CONFIDENTIALITY: All demographic and survey responses will be kept confidential. Only the researchers involved in this research opportunity will see your responses. All research data will be placed in a secure RIT server to ensure confidentiality. Your confidentiality will be protected to the degree permitted by the technology used at the Rochester Institute of Technology. If you entered this study through the About Eating New York study, your name may be linked to your responses. If so, your name will be removed before analysis and will never be made public. If you decide to participate in the raffle, you will be asked to provide your email address. All email addresses will be removed before analysis and will never be made public.

USE OF INFORMATION: All information collected from you in this research opportunity may be used in other future research. If this happens, we will remove anything that will identify you. We will use/share the de-identified information without getting additional permission (consent) from you.

YOU HAVE THE RIGHT TO ASK QUESTIONS: If you have any questions about this research opportunity you may contact: Dee Murray; email: dm6933@rit.edu; mobile: 585-355-6016. You may print this form and keep it for your records.

You may print this form and keep it for your records.

Consent Form for RIT Sona Recruitment (Method 3)

CONSENT/AUTHORIZATION FOR PARTICIPATION IN THE TRANSGENDER EATING BEHAVIOR AND DISCRIMINATION RESEARCH OPPORTUNITY

Researcher: Dee Murray
Department: Wegmans School of Health and Nutrition Rochester Institute of Technology
Address: 180 Lomb Memorial Drive, Rochester NY 14623
Phone: 585-355-6016
Version Date: (SONA) November 22, 2022

KEY INFORMATION: You are invited to participate in a research opportunity that studies the experiences of transgender and gender non-conforming individuals involving discrimination. Participation in this research is voluntary. You do not have to participate in the research opportunity if you do not want to. If you decide to participate, you will be tasked to complete a survey accessible online using either a smartphone, tablet, or PC/laptop. The survey is estimated to take approximately 15 minutes in total. Some of the benefits of this research are being able to apply the findings of this research opportunity to ways that can address issues faced by the transgender and gender non-conforming community.

INTRODUCTION: Thank you for your interest in this research opportunity! Kindly read more about the research opportunity below before proceeding. At the bottom of this consent form, please indicate that you understand what the research opportunity is about and you agree to participate in the research opportunity.

PURPOSE: The research aims to get your input regarding your eating behaviors and any forms of discrimination you may have experienced. This research opportunity is conducted by Dee Murray, a graduate student of the Health and Well-Being Management Program, for her graduate thesis completion. The researcher is under the guidance of an advisor, Dr. Barbara Lohse.

WHAT YOU WILL DO AND HOW MUCH TIME IS INVOLVED: You will be asked to complete a survey online; you can access this survey through any smartphone, tablet, or PC/laptop. The survey will ask about your eating habits, different forms of discrimination you have faced, and any perceived stress you may have experienced. Answering the survey questions will take about 15 minutes. Once you start the survey you must complete it in one sitting.

PAYMENT FOR PARTICIPATION: You will receive one (1) Sona credit for completing the study.

RISKS/BENEFITS: There can be a potential minimal psychological risk in terms of a change in your behavior and outlook. Some of the questions regarding discrimination and eating behaviors can be sensitive topics for you. After participation in the study, you might have negative thoughts and emotions when thinking about your eating behaviors and the different forms of discrimination you encounter daily. There may be other risks associated with the research that we are currently not aware of. There is also always the risk of secure data being breached by someone who is not part of the research. One benefit of participating in this research opportunity is learning more about your eating habits and understanding your needs and challenges as a community.

VOLUNTARY PARTICIPATION: If you do not want to answer any questions in the survey, you may skip them. You can also stop the survey at any time. If you decide to stop, there will be no loss to any benefit or resources you are currently receiving. You must agree that you are 18 years of age or older and identify as transgender and/or gender non-conforming

CONFIDENTIALITY: No personally identifying information will be recorded. All demographic and survey responses will be kept confidential. Only the researchers involved in this research opportunity will see your responses. All research data will be placed in a secure RIT server to ensure confidentiality. Your confidentiality will be protected to the degree permitted by the technology used at the Rochester Institute of Technology.

USE OF INFORMATION: All information collected from you in this research opportunity may be used in other future research. If this happens, we will remove anything that will identify you. We will use/share the de-identified information without getting additional permission (consent) from you.

YOU HAVE THE RIGHT TO ASK QUESTIONS: If you have any questions about this research **opportunity you may contact: Dee Murray**; email: dm6933@rit.edu; mobile: 585-355-6016. You may print this form and keep it for your records.

You may print this form and keep it for your records.

Appendix D

Qualtrics Survey

Qualtrics Survey

Introduction	Thank you for participating in a research study about Transgender and Gender Non-Conforming Well-being!  This research study is about understanding the health behaviors of the transgender and gender non-conforming community living in the state of New York.
Consent (not included; see Appendix C) with Participant Agreement	YOU HAVE THE RIGHT TO ASK QUESTIONS: If you have any questions about this research opportunity you may contact: Dee Murray; email: dm6933@rit.edu; mobile: 585-355-6016. You may print this form and keep it for your records. Please choose one of the following: I agree to participate in the study. I do not wish to participate in the study.
Gender Rule-Out	Do you identify as transgender, gender non-conforming, and/or non-binary? Yes No

New York State resident check	Do you live in New York State? Yes No
Eating disorder check	Have you been diagnosed with an eating disorder? Yes No
Demographics: Age	How old are you? Under 18 18-24 years old 25-34 years old 35-44 years old 45-54 years old 55-64 years old 65+ years old

Demographics: Gender Identity	Please select all that describe you: Transgender man Nonbinary (enby) Transgender woman Two-spirit Gender non-conforming Cisgender Gender queer Any term not listed: Agender
Demographics: Race/Ethnicity	What is your race/ethnicity? (You may choose one or more ethnic groups you most identify with) White (Non-Hispanic) Black or African-American Hispanic or Latino Asian Native American Hawaiian Native or Pacific Islander Alaskan Native
Instruments Section	Appendix E
End of Survey: Email address	You have reached the end of the survey. We are offering you an opportunity to be entered in a drawing for an Amazon gift card worth $35. To be included in the drawing, please provide a working email address below. Your email address will be kept confidential and will not be shared with anyone. If you do not wish to be included in the drawing, you may press the 'next' button anytime. Please enter your email address below.

End of Survey: Purpose and Contact Hotlines	The purpose of this study was to understand how prejudice/discrimination affects healthy eating among transgender and gender non-conforming individuals. If you were distressed by these questions, you may reach out to: **LGBTQIA+ National Hotline** 1-888-843-4564 www.glbthotline.org **Trans Lifeline** 877-565-8860 www.translifeline.org
End of Survey	RIT We thank you for your time spent taking this survey. Your response has been recorded.

Appendix E

Instruments

Satter Eating Competence Inventory (ecSI 2.0™)

Below are statements about your eating. Think about each one, then choose the best response for you.

A = Always O = Often S = Sometimes R = Rarely N = Never

1. I am relaxed about eating.	**A**	**O**	**S**	**R**	**N**
2. I am comfortable about eating enough.	**A**	**O**	**S**	**R**	**N**
3. I have regular meals.	**A**	**O**	**S**	**R**	**N**
4. I feel it is okay to eat food that I like.	**A**	**O**	**S**	**R**	**N**
5. I experiment with new food and learn to like it.	**A**	**O**	**S**	**R**	**N**
6. If the situation demands, I can “make do” by eating food I don’t much care for.	**A**	**O**	**S**	**R**	**N**
7. I eat a wide variety of foods.	**A**	**O**	**S**	**R**	**N**
8. I am comfortable with my enjoyment of food and eating.	**A**	**O**	**S**	**R**	**N**
9. I trust myself to eat enough for me.	**A**	**O**	**S**	**R**	**N**
10. I eat as much as I am hungry for.	**A**	**O**	**S**	**R**	**N**
11. I tune in to food and pay attention to eating.	**A**	**O**	**S**	**R**	**N**
12. I make time to eat.	**A**	**O**	**S**	**R**	**N**
13. I eat until I feel satisfied.	**A**	**O**	**S**	**R**	**N**
14. I enjoy food and eating.	**A**	**O**	**S**	**R**	**N**
15. I consider what is good for me when I eat.	**A**	**O**	**S**	**R**	**N**
16. I plan for feeding myself.	**A**	**O**	**S**	**R**	**N**

Scoring:
All items summed to obtain a total score
If total score ≥ 32 then eating competent
If total score < 32 then not eating competent

Three Factor Eating Questionnaire – 18 Item (TFEQ-18)

	Definitely True	Mostly True	Mostly False	Definitely False
1. When I smell a sizzling steak or juicy piece of meat, I find it very difficult to keep from eating, even if I have just finished a meal.	☐	☐	☐	☐
2. I deliberately take small helpings as a means of controlling my weight.	☐	☐	☐	☐
3. When I feel anxious, I find myself eating.	☐	☐	☐	☐
4. Sometimes when I start eating, I just can't seem to stop.	☐	☐	☐	☐
5. Being with someone who is eating often makes me hungry enough to eat also.	☐	☐	☐	☐
6. When I feel blue, I often overeat.	☐	☐	☐	☐
7. When I see a real delicacy, I often get so hungry that I have to eat right away.	☐	☐	☐	☐
8. I get so hungry that my stomach often seems like a bottomless pit.	☐	☐	☐	☐
9. I am always hungry so it is hard for me to stop eating before I finish the food on my plate.	☐	☐	☐	☐
10. When I feel lonely, I console myself by eating.	☐	☐	☐	☐
11. I consciously hold back at meals in order not to gain weight.	☐	☐	☐	☐
12. I do not eat some foods because they make me feel fat.	☐	☐	☐	☐
13. I am always hungry enough to eat at any time.	☐	☐	☐	☐

14. How often do you feel hungry?

(Only at meal times (1), sometimes between meals (2), often between meals (3), almost always (4))

15. How frequently do you avoid "stocking up" on tempting foods?

(Almost never (1), seldom (2), usually (3), almost always (4))

16. How likely are you to consciously eat less than you want?

(Unlikely (1), slightly likely (2), moderately likely (3), very likely (4))

17. Do you go on eating binges though you are not hungry?

(Never (1), rarely (2), sometimes (3), at least once a week (4))

18. On a scale of 1 to 8, where 1 means no restraint in eating (eating whatever you want, whenever you want it) and 8 means total restraint (constantly limiting food/ intake and never 'giving in'), what number would you give yourself?

1 2 3 4 5 6 7 8

(1-eat whatever I want, whenever I want it, 8-constantly limiting food intake, never 'giving in')

Scoring:

- Subscales-
  - The cognitive restraint scale was composed of items 2, 11, 12, 15, 16, and 18.
  - The uncontrolled eating scale was composed of items 1, 4, 5, 7, 8, 9, 13, 14, and 17.
  - The emotional eating scale was composed of 3, 6, and 10.
- Recoding item 18-
  - 1-2 scores were coded 1
  - 3-4 scores were coded 2
  - 5-6 scores were coded 3
  - 7-8 scores were coded 4

Worry about Money for Food question

How frequently do you worry about having enough money for food?

- ○ Always
- ○ Often
- ○ Sometimes
- ○ Rarely
- ○ Never

Transgender Discrimination Scale – 21 Item (TDS-21)

Please think carefully about your life as you answer the questions below. For each question, read the question and then answer for what the **PAST YEAR** has been like. Only include events that occurred because of others' prejudice. Choose....

- If the event has NEVER happened to you.
- If the event happened ONCE IN A WHILE (less than 10% of the time)
- If the event happened SOMETIMES (10 - 25% of the time)
- If the event happened A LOT (26 - 40% of the time)
- If the event happened MOST OF THE TIME (50 - 70% of the time)
- If the event happened ALMOST ALL OF THE TIME (more than 70% of the time)

BECAUSE OF OTHERS' PREJUDICE AGAINST TRANSGENDER / NON-BINARY / GENDER NON-CONFORMING PEOPLE, HOW OFTEN HAVE YOU ...

	Never	Once in a while	Sometimes	A lot	Most of the time	Almost all of the time
Had others deny or minimize your experiences of transgender discrimination?	○	○	○	○	○	○
Been denied opportunities in the workplace (e.g., promotion, raise, opportunities to work with customers, work on certain project, not offered professional development opportunities)?	○	○	○	○	○	○
Experienced maltreatment in health care settings?	○	○	○	○	○	○
Experienced harassment or bullying from peers in educational settings?	○	○	○	○	○	○

	Never	Once in a while	Sometimes	A lot	Most of the time	Almost all of the time
Experienced harassment (e.g., slurs, physical harm, pro- longed "pat downs") from law enforcement (e.g., police officers, security officials, transportation security administration)?	○	○	○	○	○	○
Been judged by others after they learned about your gender identity?	○	○	○	○	○	○
Heard comments that all transgender persons are the same (e.g., assumptions that all transgender people undergo or wish to undergo gender affirming surgeries)?	○	○	○	○	○	○

	Never	Once in a while	Sometimes	A lot	Most of the time	Almost all of the time
Experienced limited mentorship in career settings?	○	○	○	○	○	○
Been discriminated against while trying to access health care (e.g., gynecological exams, shots, prostate exams, etc.)?	○	○	○	○	○	○
Had teachers or instructors refuse to stop abuse or bullying directed toward you?	○	○	○	○	○	○
Been unfairly questioned about your gender identity by law enforcement (e.g., police officers, security officials, transportation security administration)?	○	○	○	○	○	○

	Never	Once in a while	Sometimes	A lot	Most of the time	Almost all of the time
Experienced people in your life who refused to use your true gender pronouns (e.g., he, her, they, zir)?	○	○	○	○	○	○
Received demeaning messages about your physical appearance (e.g., you do not look "enough" like your true gender identity, comments about your attire, "I never would have known that you're trans")?	○	○	○	○	○	○
Been denied employment?	○	○	○	○	○	○

	Never	Once in a while	Sometimes	A lot	Most of the time	Almost all of the time
Had to educate doctors, nurses, or administrative staff about transgender-related health care?	○	○	○	○	○	○
Experienced harassment from faculty, staff, and administrators in educational settings?	○	○	○	○	○	○
Heard intrusive comments about your body (e.g., "what's between your legs?")?	○	○	○	○	○	○
Been expected to be or act in gender-conforming ways?	○	○	○	○	○	○

	Never	Once in a while	Sometimes	A lot	Most of the time	Almost all of the time
Experienced social rejection in educational settings?	○	○	○	○	○	○
Experienced harassment from family members?	○	○	○	○	○	○
Been stopped by law enforcement (e.g., police officers, security officials, transportation security administration) and unfairly questioned?	○	○	○	○	○	○

Cohen Perceived Stress Scale – 14 Item (PSS-14)

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate *how often* you felt or thought a certain way. Although some of the questions are similar, there are differences between them, and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the number of times you felt a particular way; rather indicate the alternative that seems like a reasonable estimate. For each question choose from the following alternatives:

1. never
2. almost never
3. sometimes
4. fairly often
5. very often

	Never	Almost Never	Sometimes	Fairly Often	Very Often
1. In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2. In the last month, how often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
3. In the last month, how often have you felt nervous and "stressed"?	0	1	2	3	4
4. In the last month, how often have you dealt successfully with day-to-day problems and annoyances? (R)	0	1	2	3	4
5. In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life? (R)	0	1	2	3	4
6. In the last month, how often have you felt confident about your ability to handle your personal problems? (R)	0	1	2	3	4
7. In the last month, how often have you felt that things were going your way? (R)	0	1	2	3	4
8. In the last month, how often have you found that you could not cope with all the things you had to do?	0	1	2	3	4

9. In the last month, how often have you been able to control irritations in your life? (R)	0	1	2	3	4
10. In the last month, how often have you felt that you were on top of things? (R)	0	1	2	3	4
11. In the last month, how often have you been angered because of things that were outside of your control?	0	1	2	3	4
12. In the last month, how often have you found yourself thinking about things that you have to accomplish?	0	1	2	3	4
13. In the last month, how often have you been able to control the way you spend your time? (R)	0	1	2	3	4
14. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Scoring:

Each item is rated on a 5-point scale ranging from never (0) to almost always (4). Positively worded items are reverse scored, and the ratings are summed, with higher scores indicating more perceived stress. For example, 0=4, 1=3, 2=2, etc. and then summing across all items.

- For PSS-14: items 4, 5, 6, 7, 9, 10, and 13 are the positively stated items. This scale measures the degree to which situations in one's life are appraised as stressful.

REFERENCES

1. Meyer IH. Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: conceptual issues and research evidence. *Psychol Bull.* 2003;129(5):674-697. doi:10.1037/0033-2909.129.5.674
2. Dentato MP. The minority stress perspective. American Psychology Association. Published April 2012. Accessed April 30, 2023. https://www.apa.org/pi/aids/resources/exchange/2012/04/minority-stress
3. How do microaggressions affect the LGBTQ+ community. New York Presbyterian. Published June 15, 2021. Accessed April 30, 2023. https://healthmatters.nyp.org/how-microaggressions-affect-the-lgbtq-community/
4. Nadal KL, Skolnik A, Wong Y. Interpersonal and systemic microaggressions toward transgender people: Implications for counseling. *J LGBT Issues Couns*. 2012;6(1):55-82. doi:10.1080/15538605.2012.648583
5. Nadal KL. Measuring LGBTQ microaggressions: the sexual orientation microaggressions scale (SOMS) and the gender identity microaggressions scale (GIMS). *J Homosex*. 2019;66(10):1404-1414. doi:10.1080/00918369.2018.1542206
6. Gruberg S, Mahowald L, Halpin J. The state of the LGBTQ community in 2020: a national public opinion study. Center for American Progress. Published October 6, 2020. Accessed April 30, 2023. https://www.americanprogress.org/article/state-lgbtq-community-2020/
7. Malina S. Unique causes and manifestations of eating disorders within transgender populations. *Columbia Social Work Rev.* 2021; 19(1):138-157. doi:10.52214/cswr.v19i1.7241

8. Lefevor GT, Boyd-Rogers CC, Sprague BM, Janis RA. Health disparities between genderqueer, transgender, and cisgender individuals: An extension of minority stress theory. *J Couns Psychol*. 2019;66(4):385-395. doi:10.1037/cou0000339
9. Jäggi T, Jellestad L, Corbisiero S, et al. Gender minoritysStress and depressive symptoms in transitioned swiss transpersons. *Biomed Res Int*. 2018;2018. doi:10.1155/2018/8639263
10. Hendricks ML, Testa RJ. A conceptual framework for clinical work with transgender and gender nonconforming clients: An adaptation of the minority stress model. *Prof Psychol Res Pr*. 2012;43(5):460-467. doi:10.1037/a0029597
11. Van de Grift TC, Cohen-Kettenis PT, Elaut E, et al. A network analysis of body satisfaction of people with gender dysphoria. *Body Image*. 2016;17:184-190. doi:10.1016/j.bodyim.2016.04.002
12. Anderson M. What is disordered eating? Academy of Nutrition and Dietetics. Published October 6, 2018. Accessed April 30, 2023. https://www.eatright.org/health/diseases-and-conditions/eating-disorders/what-is-disordered-eating
13. Parker LL, Harriger JA. Eating disorders and disordered eating behaviors in the LGBT population: a review of the literature. *J Eat Disord*. 2020;8:51. doi:10.1186/s40337-020-00327-y
14. Diemer E, Grant J, Munn-Chernoff M, Patterson D, Duncan A. Gender identity, sexual orientation, and eating-related pathology in a national sample of college students. *J Adolesc Health*. 2015;57(2):144-149. doi:10.106/j.jadohealth.2015.03.003
15. The Ellyn Satter Institute. ellynsatterinstitute.org. Updated April 2023. Accessed April 30, 2023. https://www.ellynsatterinstitute.org/satter-eating-competence-model/

16. Lohse B, Satter E, Horacek T, Gebreselassie T, Oakland MJ. Measuring eating competence: psychometric properties and validity of the ecSatter inventory. *J Nutr Educ Behav*. 2007;39(5):S154-S166. doi:10.1016/j.jneb.2007.04.371

17. Karlsson J, Persson LO, Sjöström L, Sullivan M. Psychometric properties and factor structure of the three-factor eating questionnaire (TFEQ) in obese men and women. results from the Swedish obese subjects (SOS) study. *Int J Obes Relat Metab Disord*. 2000;24(12):1715-1725. doi:10.1038/sj.ijo.0801442

18. de Lauzon B, Romon M, Deschamps V, et al. The Three-Factor Eating Questionnaire-R18 is able to distinguish among different eating patterns in a general population. *J Nutr*. 2004;134(9):2372-2380. doi:10.1093/jn/134.9.2372

19. Beiseigel JM, Nickols-Richardson SM. Cognitive eating restraint scores are associated with body fatness but not with other measures of dieting in women. *Appetite*. 2004;43(1):47-53. doi:10.1016/j.appet.2004.02.002

20. Anglé S, Engblom J, Eriksson T, et al. Three factor eating questionnaire-R18 as a measure of cognitive restraint, uncontrolled eating and emotional eating in a sample of young Finnish females. *Int J Behav Nutr Phys Act*. 2009;6:41. doi:10.1186/1479-5868-6-41

21. Milano W, Ambrosio P, Carizzone F, De Biasio V, Foggia G, Capasso A. Gender dysphoria, eating disorders and body image: an overview. *Endocr Metab Immune Disord Drug Targets*. 2019;20(4):518-524. doi:10.2174/1871530319666191015193120

22. Walker DC, White EK, Srinivasan VJ. A meta-analysis of the relationships between body checking, body image avoidance, body image dissatisfaction, mood, and disordered eating. *Int J Eat Disord.* 2018;51(8):745-770. doi:10.1002/eat.22867

23. Grannis C, Leibowitz SF, Gahn S, et al. Testosterone treatment, internalizing symptoms, and body image dissatisfaction in transgender boys. *Psychoneuroendocrinology*. 2021;132. doi:10.1016/j.psyneuen.2021.105358
24. Witcomb GL, Bouman WP, Brewin N, Richards C, Fernandez-Aranda F, Arcelus J. Body image dissatisfaction and eating-related psychopathology in trans individuals: a matched control study. *Eur Eat Disord Rev*. 2015;23(4):287-293. doi:10.1002/erv.2362
25. Murray SB, Nagata JM, Griffiths S, et al. The enigma of male eating disorders: A critical review and synthesis. *Clin Psychol Rev*. 2017;57:1-11. doi:10.1016/j.cpr.2017.08.001
26. Watson LB, Allen LR, Flores MJ, Serpe C, Farrell M. The development and psychometric evaluation of the trans discrimination scale: TDS-21. *J Couns Psychol*. 2019;66(1):14-29. doi:10.1037/cou0000301
27. Krall JS, Lohse B. Validation of a measure of the Satter eating competence model with low-income females. *Int J Behav Nutr Phys Act.* 2011;8(1):26. doi:10.1186/1479-5868-8-26
28. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav*. 1983;24(4):385-396.
29. Qualtrics [software program]. qualtrics.com. Provo, UT. https://www.qualtrics.com
30. IBM Corp. Released 2020. IBM SPSS Statistics for Mac, Version 28.0. Armonk, NY: IBM Corp.
31. Casey LS, Reisner ScD SL, Findling MG, et al. Discrimination in the United States: experiences of lesbian, gay, bisexual, transgender, and queer Americans. *Health Serv Res*. 1454;54:1454-1466. doi:10.1111/1475-6773.13229

32. Nadal KL. A decade of microaggression research and LGBTQ communities: an introduction to the special issue. *J Homosex*. 2019;66(10):1309-1316. doi:10.1080/00918369.2018.1539582

33. Bell K, Rieger E, Hirsch JK. Eating disorder symptoms and proneness in gay men, lesbian women, and transgender and non-conforming adults: comparative levels and a proposed mediational model. *Front Psychol*. 2019;9(JAN). doi:10.3389/fpsyg.2018.02692

34. Bradford J, Reisner SL, Honnold JA, Xavier J. Experiences of transgender-related discrimination and implications for health: results from the Virginia transgender health initiative study. *Am J Public Health*. 2013;103(10):1820. doi:10.2105/AJPH.2012.300796

35. de Queiroz FLN, Raposo A, Han H, Nader M, Ariza-Montes A, Zandonadi RP. Eating competence, food consumption and health outcomes: an overview. *Int J Environ Res Public Health*. 2022;19(8). doi:10.3390/IJERPH19084484

36. Linsenmeyer W, Drallmeier T, Thomure M. Towards gender-affirming nutrition assessment: a case series of adult transgender men with distinct nutrition considerations. *J Nutr*. 2020;19(1):74. doi:10.1186/s12937-020-00590-4

37. Warren JC, Smalley KB, Barefoot KN. Differences in psychosocial predictors of obesity among LGBT subgroups. *LGBT Health*. 2016;3(4):283-291. doi:10.1089/lgbt.2015.0076

38. Ålgars M, Alanko K, Santtila P, Sandnabba NK. Disordered eating and gender identity disorder: a qualitative study. *Eat Disord*. 2012;20(4):300-311. doi:10.1080/10640266.2012.668482

39. McGuire JK, Doty JL, Catalpa JM, Ola C. Body image in transgender young people: Findings from a qualitative, community-based study. *Body Image*. 2016;18:96-107. doi:10.1016/j.bodyim.2016.06.004

40. Guss CE, Williams DN, Reisner SL, Austin SB, Katz-Wise SL. Disordered weight management behaviors, nonprescription steroid use, and weight perception in transgender youth. *J Adolesc Health*. 2017;60(1):17-22. doi:10.1016/j.jadohealth.2016.08.027
41. Hughto JMW, Clark KA, Daken K, et al. Victimization within and beyond the prison walls: a latent profile analysis of transgender and gender diverse adults. *J Interpers Violence*. 2022;37(23-24):NP23075-NP23106. doi:10.1177/08862605211073102
42. Graham LF. Navigating community institutions: black transgender women's experiences in schools, the criminal justice system, and churches. *Sex Res Soc Policy*. 2014;11(274–287). doi:10.1007/s13178-014-0144-y

COMMITTEE APPROVAL

Barbara Lohse, PhD, RDN **Date**
Thesis committee chair; Head of the Wegmans School of Health and Nutrition at RIT

Alan Smerbeck, PhD **Date**

Thesis committee member; Associate professor in the Department of Psychology at RIT

Elizabeth Ruder, PhD **Date**

Thesis committee member; Associate professor in the Wegmans School of Health and Nutrition at RIT