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Aspects of body image as moderators and mediators in the relationship between minority stress and depression among diverse LGBTQIA+ identities

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ABSTRACT

LGBTQIA+ (Lesbian, Gay, Bisexual, Transgender, Queer/Questioning, Intersex, Asexual, plus) individuals are at higher risk of adverse mental health outcomes than cisgender heterosexual (cishet) individuals due to experiences of minority stress. In the current study, we compared levels of appearance anxiety, depressive symptoms, body appreciation and self-esteem among LGBTQIA+ and cishet individuals. Further, among LGBTQIA+ individuals, we tested a hybrid theoretical model to examine the protective effects of body appreciation and self-esteem in the relationships between minority stress, appearance anxiety, and depression. A total of 581 participants (aged 16–65) completed demographic and psychometric measures, including the Minority Stress Measure, Body Appreciation Scale-2, Rosenberg Self-Esteem Scale, Physical Appearance State and Trait Anxiety Scale, and Beck Depression Inventory, via an online survey. Results confirmed that LGBTQIA+ individuals had poorer mental health outcomes than cishet participants, characterised by higher levels of depressive symptoms and appearance anxiety, and lower body appreciation and self-esteem. Further, our hybrid model showed that LGBTQIA+ individuals with lower body appreciation and self-esteem were particularly vulnerable to appearance anxiety and depression related to minority stress, whilst body appreciation reduced the impact of minority stress on depression. These findings may inform potential directions for interventions targeted towards LGBTQIA+ populations.

1. Introduction

LGBTQIA+ (Lesbian, Gay, Bisexual, Transgender, Queer/Questioning, Intersex, Asexual, plus) people are more likely than cisgender heterosexual (cishet) people to experience a range of negative outcomes, including depression (Strübel et al., 2020) and poorer body image (Kalash et al., 2023). Two theoretical models in particular – the minority stress model and the tripartite influence model – have been used by researchers to explain how broader societal stigma and prejudice towards people of diverse gender and sexual orientation identities, and sociocultural pressure to conform to gender-stereotyped appearance standards contribute to more negative outcomes among LGBTQIA+ people.

Meyer's minority stress model (1995), which is based upon Brooks' foundational work (1981, as cited by Moradi et al., 2023), proposes that there are two main types of 'stressors' which can exert negative influence on LGBTQIA+ people's lives and wellbeing. Distal stressors are explicit, external instances of prejudice and discrimination emanating from society or others, and proximal stressors include internalised societal prejudice and concealment of self-identity (Meyer, 2003). These stressors can create an outlook or worldview shaped by threat-hypervigilance, concealment of sexual and/or gender identity (Holman et al., 2022), and internalisation of anti-LGBTQIA+ sentiments in the form of shame or guilt (Frost & Meyer, 2023; Meyer, 1995).

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Studies have shown that a greater prevalence of stressors in the lives of LGBTQIA+ individuals is associated with increased depression (Dürrbaum & Sattler, 2020; McCarthy et al., 2014), body image concerns (Burnette et al., 2019; Kimmel & Mahalik, 2005; Soulliard & Vander Wal, 2019), and lower self-esteem (Bridge et al., 2022).

Our second theoretical model, the tripartite influence model (Thompson et al., 1999), explains how internalised societal appearance standards can negatively impact body image, which in turn can lead to disordered eating. Society produces and transmits (via channels such as the media, friends, and family) stereotypical appearance standards that reproduce and value stereotypically binary gender norms (e.g., women should be small, slim, and 'feminine', and men should be strong, muscular, and 'masculine'). Individuals may internalise these standards as those they should aspire to. If an individual perceives themselves as disparate from this internalised standard, this can set up appearance anxiety and body dissatisfaction, which are known to be associated with depression, low self-esteem and unhealthy appearance-related behaviours (Thompson & Smolak, 2001).

While the tripartite influence model was originally conceived and tested on women, it has since been applied to men (Schaefer et al., 2021) and individuals of diverse gender and sexual identities (Strübel et al., 2020; Tylka & Andorka, 2012). LGBTQIA+ individuals' self-identity and appearance may differ from societally dominant binary gendered norms; however, they may still experience or succumb to pressure to conform with or internalise them, to 'pass' or conceal their gender or sexual identity to avoid societal discrimination and hostility (Riggle et al., 2017).

In the current study we drew together elements of the minority stress model and the tripartite influence model to investigate intersecting pressures that emanate from both societal hostility towards people of diverse genders and sexual orientation identities, and society's gender-stereotyped appearance standards. Integrating these models provides a broader framework for understanding the impacts of sociocultural factors on LGBTQIA+ psychological wellbeing. The minority stress model explains how distal and proximal stressors can erode psychosocial resources such as self-esteem, and leave individuals less able to resist internalizing cisheteronormative appearance standards (Williams et al., 2017). This vulnerability may be further compounded by pressures to conform to both cishet ideals to conceal identity, avoid stigma, and gain safety, and to LGBTQIA+ 'subculture' ideals to secure community validation and belonging (Mason & Lewis, 2016). The tripartite influence model similarly posits how 'distal' sociocultural stressors (i.e., pressure to conform to cishet appearance ideals transmitted through media, peers, and parents) and 'proximal' stressors (i.e., internalization of and self-comparison with cishet appearance standards) can negatively impact LGBTQIA+ body image and related outcomes. Previous research has shown that negotiating these dual appearance standards can foster maladaptive coping strategies in the form of heightened body preoccupation and appearance anxiety, which in turn elevate the risk of depression (Li et al., 2024; Santoniccolo et al., 2025).

Hybrid models have previously been used to draw together elements of theoretical models to incorporate various sociocultural factors and psychological states of individuals/groups to explain mental health outcomes among LGBTQIA+ identities (e.g., Fields & Sanders, 2016; Huxley et al., 2015). Strübel et al. (2020) also used elements of the tripartite influence model along with objectification theory to explain depressive symptoms among diverse gender identities. Following the authors' recommendations, we build on their work, and further incorporate the intersection of gender and sexual orientation identity in our participants.

1.1. Differences within LGBTQIA+ gender and sexual orientation identities

While on average LGBTQIA+ people are more likely to experience depression than cishet people (Argyriou et al., 2021), it is important not to homogenise this population (Haworth et al., 2022), as there may be differences among diverse genders and sexual orientation identities (Meyer, 2003; Su et al., 2016). For example, plurisexual identities (attracted to more than one gender, i.e., bisexual, pansexual, and polysexual) are more likely to suffer from depression and anxiety than monosexual identities (attracted to only one binary gender, i.e., heterosexual, gay, and lesbian: Feinstein et al., 2020). Regarding gender identities, some studies suggest that nonbinary and queer individuals suffer more depression than binary transgender individuals (Thorne et al., 2018); however, other research has found that trans women experienced less depression compared with trans men and nonbinary individuals (Newcomb et al., 2020). Another study found that nonbinary individuals reported higher life satisfaction than binary gender participants (Rimes et al., 2020), suggesting less susceptibility to depression.

Abundant research shows significant gender differences in appearance anxiety. Women tend to experience more appearance concerns than men (Morrison et al., 2004) due to pervasive, chronic messaging from society. This messaging emphasizes valuing women according to physical attractiveness, exerting pressure on them throughout their lives to conform to narrow, gender-stereotyped appearance standards (Moreno-Domínguez et al., 2019). Cisgender men also experience dissatisfaction with their bodily appearance (Adams et al., 2005), albeit perhaps to a lesser degree than women.

Trans men and trans women often experience more appearance anxiety and body dissatisfaction than cis men and cis women (Witcomb et al., 2015). It has been suggested that these differences are due to transgender identities experiencing 'overlapping' body image pressures: societal appearance pressures related to the gender that they self-identify as and gender dysphoria due to specific physical features that are incongruent with their self-identified gender (Witcomb et al., 2015). However, another study found no difference between trans men's and cis men's desire for muscularity (Amodeo et al., 2022). Some authors have posited that this could be due to trans men already identifying with messaging aimed at men before transitioning (McKinley et al., 2014).

Regarding differences between sexual orientation identities, research suggests that gay men experience appearance concerns similar to those of women (Wood, 2004). This could be because gay cis men also undergo self-objectification, resulting from a desire to attract men (Szymanski et al., 2019). Lesbian women appear to experience fewer appearance concerns than heterosexual women, potentially due to a rejection of mainstream heteronormative appearance stereotypes (Alvy, 2013). However, some authors posit that lesbian women often 'suffer in silence' while negotiating both mainstream appearance pressures and a lesbian subculture identity (Kelly, 2007), which would suggest an increased risk for appearance anxiety. More recent research found that individuals who are attracted to more than one gender (e.g., bisexual or pansexual) had similar levels of appearance anxiety to gay men and lesbian women but significantly greater levels than heterosexual men and women (Kahalon et al., 2024).

Taken together these mixed findings highlight the diversity in experience of depression and appearance anxiety among gender and sexual orientation identities within the LGBTQIA+ population and the need for more studies which investigate these differences.

1.2. Appearance anxiety as a mediator between minority stress and depression among LGBTQIA+ identities

Appearance anxiety may indirectly affect the relationship between experienced minority stress and depression in LGBTQIA+ people for various reasons. Firstly, proximal stressors such as vigilance, rejection sensitivity and concealment may worsen feelings of gender dysphoria from living in the 'wrong' body, resulting in increased appearance anxiety. Furthermore, appearance anxiety has been identified as a mediator between gender dysphoria and suicidality among transgender and gender-diverse samples (Li et al., 2024). A recent review has also

shown that greater gender dysphoria is associated with more depression among trans and nonbinary genders (Shelemy et al., 2024). Appearance anxiety could also arise from wanting to 'pass' as the individual's self-identified gender or to conceal an LGBTQIA+ identity (Riggle et al., 2017). Lastly, relating to community connectedness within the minority stress model, wanting to be considered desirable/attractive to others who value gender-stereotyped appearances (Hart et al., 2015) may result in LGBTQIA+ individuals paying greater attention to their appearance or conforming to societal appearance standards to avoid rejection by peers or wider society. Prior research examining the relationship between appearance anxiety and depression among LGBTQIA+ identities is sparse; however, some studies have found significant relationships among gay and bisexual men (Elmer, 2017) and between anxiety, body appreciation and depression among trans men (Tabaac et al., 2018).

1.3. Body appreciation and self-esteem as protective factors

Body appreciation may safeguard LGBTQIA+ wellbeing. Body appreciation is conceptualised as a love and respect for one's body and does not simply reflect an absence of body dissatisfaction (Tylka & Wood-Barcalow, 2015a). Having an appreciation of the body appears to preserve and protect against depression in many minoritised populations. For example, higher body appreciation was associated with reduced depressive symptoms among racially and ethnically diverse women (Ramseyer Winter et al., 2019) and with higher self-esteem, resilience and social support among bisexual, lesbian and queer women (Burnette et al., 2019). Another study found that body appreciation positively moderated the relationship between shame and depression, suggesting its potential as a protective factor on the psychological wellbeing of LGBTQIA+ identities (Marta-Simões et al., 2017). In their meta-analysis, Linardon et al. (2022) similarly showed significant negative correlations between body appreciation and depression, anxiety, general distress and appearance anxiety, and called for further research with more diverse samples (e.g., LGBTQIA+ identities).

Research sampling people of diverse gender and sexual orientation identities has suggested self-esteem may offer some protection against depression (Mereish et al., 2022; Tan et al., 2021). Self-esteem refers to an individual's evaluation of their worth or value (Mereish et al., 2022) and can protect or 'buffer' against life stressors (Galanakis et al., 2016). Qualitative work has also identified self-esteem as a key factor in how sexual minority youth cope with minority stressors, suggesting it may play a moderating role in the dynamic between experienced minority stress and mental health outcomes (Bridge et al., 2022), such as depressive symptoms.

In short, evidence suggests that body appreciation and self-esteem may offer protective effects against appearance concerns and negative outcomes, including depression. However, research sampling people of diverse LGBTQIA+ identities is still relatively scant, and as such the present study addressed this gap.

1.4. The current research

As far as we are aware, the current study is the first to consider the intersection of participants' gender *and* sexual orientation when measuring depression and correlates of sociocultural stressors and body image. Strübel et al. (2020) explained depressive symptoms among diverse gender identities but did not consider their participants' sexual orientation.

Firstly, we hypothesized that LGBTQIA+ participants will experience more appearance anxiety and depressive symptoms and lower body appreciation and self-esteem than cishet participants.

Secondly, as recommended by Strübel et al. (2020), we incorporated participants' gender *and* sexual orientation identity when comparing LGBTQIA+ identity subgroups on all variables. Based on the discussed literature, we anticipated finding some group differences in experienced minority stress, appearance anxiety, body appreciation, self-esteem and depressive symptoms.

Lastly, using a hybrid theoretical model that drew on the minority stress model and the tripartite influence model, we investigated the potentially protective contributions of body appreciation and self-esteem in the relationships between appearance anxiety and depression and between experienced minority stress and depression among LGBTQIA+ participants. We posited that there may be indirect effects of appearance anxiety on the relationship between minority stress and depressive symptoms, such that greater minority stress would lead to more depressive symptomatology through increased appearance anxiety. We also expected that body appreciation and self-esteem would positively moderate the effects of experienced minority stress and appearance anxiety, which in turn would reduce depressive symptoms. We used a partially moderated mediation analysis to test the direct and indirect effects within our model, as depicted in Fig. 1.

2. Method

2.1. Participants

Our target sample size of 300 was informed by previous research (Rogers et al., 2021) and general practices for mediation moderation analyses (Xu et al., 2024). The study was advertised via social media platforms, including Facebook, Instagram and LGBTQIA+ forums on Reddit. All individuals over the age of 16 and of any gender and sexuality were invited to take part in the study. We were keen to recruit both younger and older participants, as minority stress can impact LGBTQIA+ people at any age (Willis & Westwood, 2023).

A total of 1056 people clicked the link to the online survey and consented to take part in the study. Of those, 454 did not provide responses to the psychometric measures and so were not included in the data set. This resulted in a sample of 602 participants who provided data for the study's measures.

2.1.1. Participant gender and sexual orientation

In the online survey, participants were asked to indicate their gender. To ascertain sexual orientation, participants were asked to select all the genders they were attracted to, from the following options: men; women; nonbinary; I am asexual; unsure; other (please specify). Participants were also asked a dichotomous screening question (i.e., 'I am a cisgendered heterosexual man or woman' or, 'this does not represent my gender identity/sexual orientation') to determine their self-inclusion in the LGBTQIA+ group.

When considering how to group participants' diverse sexual orientations for the analyses, it became apparent that the binary-normative language typically used to frame sexuality may not be wholly compatible with nonbinary gendered experiences of attraction. Also, we wanted to reflect as best as possible the evident diversity of participants' genders and sexualities and consider the intersection between gender and sexual identity while still being able to conduct our chosen statistical analyses. As such, there was a great deal of discussion regarding how best to achieve this. We, the authors, believe our own diverse identities and research expertise aided us in making methodologically rigorous and ethically appropriate decisions.

We grouped participants based on the intersection between their self-identified gender, their sexual orientation identity (measured as the gender(s) they are attracted to,) and their response to the dichotomous question. This resulted in five groups, based on attraction to: same binary gender (gay men and lesbian women); opposite binary gender (heterosexual men and women); both binary genders (bisexual men and women); multiple genders (including nonbinary genders); asexual. Participants who selected 'unsure' were not included due to lack of information ($N = 11$). Participants who selected 'other' and self-described who they were attracted to were included in the relevant subgroup

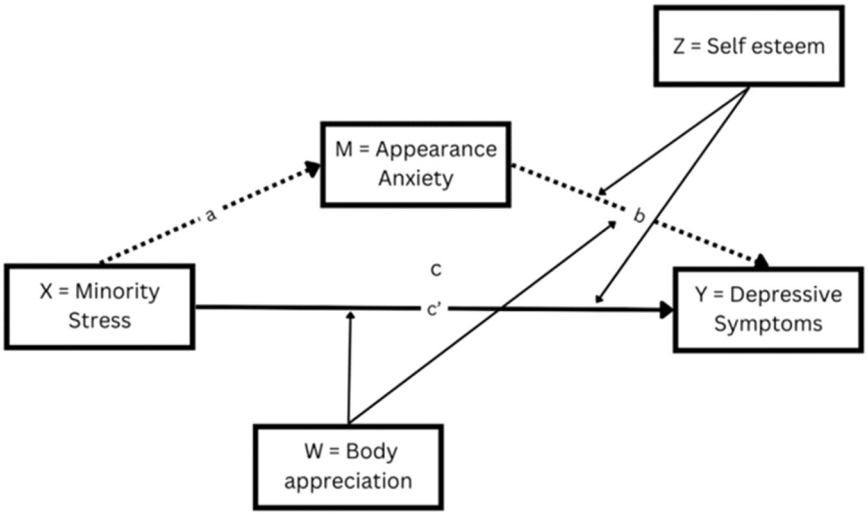

Fig. 1. Conceptualisation of the moderated mediation model, where dotted lines denote the indirect path (ab) and the solid line denotes the direct path (c').

where possible. Additionally, we were unable to include participants with more unique intersecting gender and sexual orientation identities (e.g., a nonbinary individual attracted only to men) due to their small number ($N = 10$).

The final sample consisted of 581 participants aged 16–65 years old ($M = 24.44$, $SD = 8.01$). See Table 1 for sample descriptives for participants' self-identified gender and the sexual orientation groupings used in the analyses.

2.2. Measures

To measure experienced societal stress related to belonging to the LGBTQIA+ community, we employed a shortened version of the Minority Stress Measure (MSM; Outland, 2016). The scale consists of 25 items measuring LGBT minority stress (e.g., "*I expect that others will not accept me because I am LGBT*"). There are seven subscales: Identity Concealment, Everyday Discrimination/Microaggressions, Rejection Anticipation, Discrimination Events, Internalized Stigma, Victimization Events and Community Connectedness (Outland, 2016). Participants respond using a 5-point Likert scale, where 1 = "*never happens*" or "*strongly disagree*" and 5 = "*happens all of the time*" or "*strongly agree*". The positive dimension of 'Community Connectedness' is reverse scored. An overall mean score is calculated; higher mean scores indicate experiencing greater minority stress. The Cronbach's alpha for this sample was.88, demonstrating good internal consistency.

Beck's Depression Inventory (BDI; Beck & Steer, 1984) is a 30-item questionnaire that measures levels of depressive symptoms. Each item pertains to a specific phenomenon or experience that participants may or may not be experiencing, e.g., being sad or unhappy. Responses are scored from 0 to 3, with 0 indicating little or no occurrence and 3 indicating very frequent occurrence. Scores are calculated by summing item responses. Higher scores indicate higher levels of depressive symptoms. The Cronbach's alpha was.93, indicating excellent internal consistency.

The Physical Appearance State and Trait Anxiety Scale (state version - PASTAS; Reed et al., 1991) was used to measure participants' current level of appearance anxiety. The scale consists of 16 items that assess how anxious an individual currently feels about their appearance. Response options are on a 5-point scale from 1 '*never*' to 5 '*always*'. In the present study, only the 8 items that focus on body appearance concerns were used. Item responses are summed; higher total scores indicate higher body appearance anxiety. The Cronbach's alpha for this sample was .88, demonstrating good internal consistency.

The Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015b) was used to assess general appreciation of the body. There are 10 items (e.g., "*I respect my body*") measured using a 5-point Likert scale from 1 '*never*' to 5 '*always*'. An overall mean score is calculated, with higher scores signifying greater body appreciation. The scale has been validated for use in LGBTQIA+ populations (Paquette et al., 2022; Soulliard & Vander Wal, 2019). Cronbach's alpha was .95, demonstrating excellent internal consistency.

The Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1979) assessed participants' general self-esteem. There are 10 items (e.g., "*I take a positive attitude towards myself*") measured on a 4-point scale from 1 '*strongly disagree*' to 4 '*strongly agree*'. Items 2, 5, 6, and 9 are reverse scored. Item responses are summed, with higher scores indicating higher self-esteem. Cronbach's alpha was .92, demonstrating excellent internal consistency.

Table 1
Whole sample descriptives for participants' self-identified gender and our sexual orientation groupings.

Characteristic	*n*	%
Gender		
Cisgender women	286	49.23 %
Cisgender men	201	34.60 %
Nonbinary	41	7.06 %
Trans women	13	2.24 %
Trans men	24	4.13 %
Self-described (mostly 'agender', 'demigirl', or 'gender queer')	16	2.75 %
Sexual Orientation		
Attracted to multiple genders	209	35.97 %
Attracted to opposite binary gender	165	28.40 %
Attracted to same binary gender	82	14.11 %
Attracted to both binary genders	73	12.56 %
Asexual	52	8.95 %

2.3. Procedure

Participants took part anonymously via an online survey hosted on Qualtrics. First, participants were shown the information sheet and were asked to provide informed consent. Participants then completed demographic information and responded to the psychometric measures in the following order: MSM (if participants had identified as belonging to the LGBTQIA+ community), BAS-2, RSES, PASTAS, and BDI.

Ethical approval for the study was given by the School of Psychology Research Ethics Committee (SOPREC) at the University of Lincoln (PSY1920181).

2.4. Data handling and statistical analyses

To ensure the integrity of the raw data set before carrying out our analyses, as per Bowen et al. (2008), the date, time, duration of study completion, and unique IDs of all participants were reviewed for authenticity. No cases within our final sample required removal due to poor data integrity.

All data were analysed using IBM SPSS Statistics (version 29). For psychometric measures, participants were given the choice of 'prefer not to say' for all items. As such, total scores for psychometrics were calculated using the given responses. T-tests were conducted to look for statistical differences between cishet and all LGBTQIA+ participants' mean scores for all psychometric measures.

A series of one-way ANOVAs were then conducted to determine any statistically significant differences between diverse sexual orientation subgroups for all psychometric measures. Skewness and kurtosis Z values and visual inspection of histograms were used to inspect normality. Where normality was violated, non-parametric alternatives for correlations, t-tests, and ANOVAs were used to analyse these variables. Due to programming incompatibilities/errors, 35 LGBTQIA+ participants were not redirected to complete the MSM and so were not included in these analyses, resulting in a final sample of 382 LGBTQIA+ participants for the mediation moderation analysis.

Finally, to test our theoretical model, a moderated mediation analysis using Preacher and Hayes' (2008) process macro for SPSS incorporating psychometric measure data of LGBTQIA+ participants. Fig. 1 presents a conceptualisation of the full model. We chose a moderated mediation model rather than a serial mediation model because our primary aim was to test when and for whom the indirect and direct effects of minority stress on depression occur, specifically, whether body appreciation and self-esteem are 'protective factors'. We predicted that body appreciation and self-esteem would be protective i.e., weaken the impact of minority stress on depressive symptoms, so these variables were more appropriate as moderators rather than mediators. In our conceptual framework, body appearance anxiety was theorised as the main mediator that explains *how* minority stress contributes to depression. However, for body appreciation and self-esteem, we did not have justification for a sequential causal link to include these as mediators.

3. Results

3.1. Group differences in scores for psychometric measures

Table 2 shows the descriptive statistics for all psychometric measures for LGBTQIA+ participants and cishet participants. Independent t-tests revealed that LGBTQIA+ participants reported significantly lower body appreciation, $t(579) = 2.80$, $p = .005$, small effect size Cohen's $d = .258$, and lower self-esteem, $t(579) = 4.10$, $p < .001$, small effect size Cohen's $d = .378$, than cishet participants. Mann-Whitney U tests showed that LGBTQIA+ participants reported significantly higher depressive symptomatology, $U(N = 581) = 40363.00$, $z = 3.39$, $p < .001$, and greater appearance anxiety, $U(N = 581) = 42021.00$, $z = 4.30$, $p < .001$, than cishet participants.

A series of one-way ANOVAs (or Kruskal-Wallis tests as the non-parametric alternative) were conducted to look for differences in scores among our LGBTQIA+ subgroups for all psychometric measures. There was a significant difference in minority stress scores, $X(3, N = 382) = 14.16$, $p = .003$. Bonferroni-adjusted pairwise comparisons indicated that individuals attracted to both binary genders, $M = 1.78$, $SD = 0.41$, reported significantly lower minority stress than those attracted to the same binary gender, $M = 2.13$, $SD = 0.60$; $p = .002$, and to multiple genders, $M = 2.05$, $SD = 0.56$; $p = .008$.

There was a significant difference in subgroup scores for self-esteem, $F(3, 412) = 2.70$, $p = .046$, eta squared $= .019$. Bonferroni-adjusted pairwise comparisons indicated that individuals attracted to both binary genders, $M = 26.29$, $SD = 6.91$, reported significantly higher self-esteem than asexual participants, $M = 23.02$, $SD = 7.23$, $p = .032$.

There were no significant differences in subgroup scores for depressive symptomatology, $X(3, N = 416) = 1.59$, $p = .662$, body appreciation, $F(3, 412) = 2.31$, $p = .076$, or appearance anxiety, $X(3, N = 416) = 6.34$, $p = .096$.

Table 2
Descriptive statistics (mean, standard deviation, minimum, and maximum) for scores on the psychometric measures, separately for cisgender heterosexual and LGBTQIA+ participants, and gender and sexual orientation identities subgroups.

	LGBTQIA+ ($n = 417$)			Cisgender heterosexual ($n = 164$)			
	M (SD)	Min	Max	*M* (SD)	Min	Max	*p*
BDI	16.93 (12.02)	0.00	57.00	12.49 (10.60)	0.00	48.00	***
BAS−2	3.04 (0.93)	1.00	5.00	3.28 (0.91)	1.10	5.00	*
PASTAS	21.57 (7.62)	8.00	40.00	19.36 (7.58)	8.00	40.00	***
RSES	25.10 (6.48)	10.00	40.00	27.55 (6.51)	12.00	40.00	***
MSM	2.01 (0.56)[1]	1.00	4.00				
Attracted to multiple genders ($n = 209$)							
BDI	16.28 (11.60)	0.00	53.00				
BAS−2	3.15 (0.90)	1.00	5.00				
PASTAS	21.04 (7.40)	8.00	40.00				
RSES	25.26 (6.22)	10.00	40.00				
MSM	2.05 (0.56)[2]	1.12	4.00				
Attracted to same binary gender ($n = 82$)							
BDI	16.61 (10.91)	1.00	47.00				
BAS−2	2.86 (0.92)	1.00	4.70				
PASTAS	22.61 (7.12)	8.00	39.00				
RSES	25.10 (5.91)	12.00	39.00				
MSM	2.13 (0.60)[3]	1.16	3.56				
Attracted to both binary genders ($n = 73$)							
BDI	17.19 (12.95)	0.00	51.00				
BAS−2	3.06 (0.93)	1.00	5.00				
PASTAS	22.82 (8.59)	8.00	40.00				
RSES	26.28 (6.91)	13.00	40.00				
MSM	1.78 (0.41)[4]	1.00	3.20				
Asexual ($n = 52$)							
BDI	19.25 (13.73)	2.00	57.00				
BAS−2	2.90 (1.03)	1.00	5.00				
PASTAS	20.12 (7.55)	8.00	38.00				
RSES	23.02 (7.23)	12.00	40.00				
MSM	2.02 (0.57)[5]	1.16	3.61				

Note. * = $p < .05$, ** = $p < .005$, *** = $p < .001$. [1] $n = 382$, [2] $n = 199$, [3] $n = 76$, [4] $n = 61$, [5] $n = 46$. BDI – Beck's Depression Inventory; BAS-2– Body Appreciation Scale-2; PASTAS – Physical Appearance State and Trait Anxiety Scale – 8 items of state scale measuring body appearance anxiety; RSES – Rosenberg Self-esteem Scale; MSM – Minority Stress Measure.

3.2. Moderated mediation model

A moderated mediation analysis tested our hypotheses that appearance anxiety would have an indirect effect on the impact of minority stress on depressive symptoms, and that body appreciation and self-

esteem would positively moderate the effects of experienced minority stress and appearance anxiety, in turn reducing depressive symptoms.

First, the assumptions of regression analysis were checked, using a multiple regression model with depressive symptoms as the outcome variable and minority stress, appearance anxiety, self-esteem and body appreciation as the predictors. Scatterplots indicated linearity. Visual inspection of the P-P plot indicated residuals were normally distributed. Predictors showed no indication of multicollinearity via Spearman's correlations (all r's $< .80$; see Table 3) and VIFs < 5. Durbin-Watson statistic was 2.02, indicating that the assumption of independence of residuals was met. However, data did not meet assumptions of homoscedasticity, as visual inspection of the scatterplot indicated values were spread in a 'cone shape' distribution, suggesting heteroscedasticity was present. Therefore, when conducting the moderated mediation analysis, we used HC4 (Cribari-Neto) heteroscedasticity-consistent inference method for robust standard errors and bootstrapping (number of bootstrap samples = 5000). All variables except BDI were mean centred for analysis. Bootstrap coefficients and 95 % confidence intervals (CIs) are reported; where the CIs do not span 0, this would indicate a significant effect ($p < .05$).

The data showed a significant a-path from minority stress to appearance anxiety, $R^2 = .052$, $F(1, 380) = 15.62$, $p < .001$, indicating greater minority stress was associated with increased appearance anxiety. The direct effect of minority stress on depressive symptoms (c' path) was not significant, however it was significantly moderated by body appreciation, but not self-esteem. At the mean level of self-esteem, the conditional effect of minority stress on depression was the strongest for small values (- 1 SD) of body appreciation, $b = 3.24$, $p = .008$, it was weaker but still significant for high values (+1 SD) of body appreciation, $b = -2.60$, $p = .044$. It was not significant for medium values (M) of body appreciation, $b = 0.32$, $p = .642$. This indicates that when body appreciation is higher (+1 *SD*), depressive symptoms are lower and have a negative relationship with minority stress (i.e., depression decreases as minority stress increases). Whereas when body appreciation is lower (-1 *SD*), depressive symptoms are higher and have a positive relationship with minority stress (i.e. depression increases with increasing minority stress - see Fig. 2). The pattern was similar across all levels of self-esteem. The b-path from appearance anxiety to depression was not significant, and there was no significant interaction between appearance anxiety and body appreciation, or appearance anxiety and self-esteem. For the full regression results, see Table 4.

The overall indices of partial moderation mediation were not significant, BAS-2: $b = -.08$, *CI* [-61 −.42]; RSES $b = -.07$, *CI* [-.16 −.01], indicating neither body appreciation nor self-esteem significantly moderated the indirect effect. Though examining the conditional indirect effect at low, medium and high values of body appreciation and self-esteem revealed a significant effect when self-esteem is low and body appreciation is low, $b = .90$, *CI* [0.34 – 1.60], or medium, $b = .83$, *CI* [0.18 – 1.62]. This suggests the moderated mediation effect is not significant overall but occurs when self-esteem is low and body appreciation is low/medium, whereby greater minority stress results in increased appearance anxiety, which then leads to greater depressive symptoms.

Table 3
Correlations between variables in the moderation mediation model.

	MSM	BAS-2	RSES	PASTAS
BAS−2	$r^s = -.31^{***}$			
RSES	$r^s = -.31^{***}$	$r = .72^{**}$		
PASTAS	$r^s = .25^{***}$	$r^s = -.57^{***}$	$r^s = -.42^{***}$	
BDI	$r^s = .29^{***}$	$r^s = -.66^{***}$	$r^s = -.79^{***}$	$r^s = .44^{***}$

Note: r = Pearson's correlation coefficient; r^s = Spearman's correlation coefficient. The MSS and BDI scores were not normally distributed, therefore, non-parametric (Spearman's) correlations were used for these variables. ** $p < .01$. *** $p < .001$. BDI – Beck's depression Inventory; BAS-2 – Body Appreciation Scale-2; PASTAS – Physical Appearance State and Trait Anxiety Scale – 8 items of state scale measuring body appearance anxiety; RSES – Rosenberg Self-esteem Scale; MSM – Minority Stress Measure.

4. Discussion

In this study, we compared LGBTQIA+ and cishet people on aspects of body image, self-esteem and depression, and further investigated differences between diverse sexual orientations and gender identities. We then used a hybrid theoretical framework drawing on the minority stress model and the tripartite influence model to explore the relationships between minority stress and depression via aspects of body image among an LGBTQIA+ sample. This framework allowed us to assess the indirect effects of appearance anxiety and the potentially moderating roles of self-esteem and body appreciation in the relationships between minority stress and depression and between appearance anxiety and depression.

Confirming findings from previous research, our results showed that relative to cishet participants, our LGBTQIA+ participants reported greater body appearance anxiety (Kelly, 2007; Witcomb et al., 2015; Wood, 2004) and depressive symptoms (Argyriou et al., 2021) and lower self-esteem (Nadal, 2019). We also found that body appreciation was lower among our LGBTQIA+ participants, a finding consistent with research showing poorer general body image in this population (Kalash et al., 2023).

Within our LGBTQIA+ sample, there were significant subgroup differences in experiences of minority stress, such that individuals attracted to the same binary gender (gay and lesbian) and to multiple genders (including nonbinary genders) reported experiencing greater minority stress compared with individuals attracted to both binary genders (bisexual). This is in line with prior research that found pansexual women experienced higher levels of gender-based violence and harassment than bisexual women (Worthen, 2022).

This difference could be explained by the concept of 'bisexual erasure', in which bisexuality as a legitimate, real or valid sexual orientation is diminished (Morgenroth et al., 2022), with bisexual women being stereotyped as 'truly heterosexual' or bisexuality being treated as 'merely a phase' (Garr-Schultz & Gardner, 2021). Moreover, the concealability of one's bisexual identity by showing attraction to and dating opposite-binary gender partners may result in perceived assumptions of heterosexuality (Dyar et al., 2014). These factors may result in reduced instances of discrimination and, consequently, less experienced minority stress.

Individuals attracted to multiple and nonbinary genders on the other hand, may experience more instances of direct discrimination because they date gender-diverse individuals. As such, they may face pressure to conceal their sexuality, resulting in additional vigilance to mitigate the risk of ridicule or erasure due to their sexuality being far less understood by society and the people they encounter (Harvey et al., 2025; McCole & Anderson, 2025). These factors may explain why our bisexual participants experienced less minority stress than participants of other plurisexual identities.

We found significant differences in self-esteem, whereby asexual individuals reported lower self-esteem than those attracted to both binary genders (bisexual men and women). Consensus regarding this finding is mixed, with one study identifying lower self-esteem among asexual individuals compared to those attracted to both binary genders (Nurius, 1983), and more recent research finding the inverse (Pluckhan, 2023). Further research investigating self-esteem among asexual individuals is highly warranted.

There were no significant differences in depressive symptomatology or body appearance anxiety among our LGBTQIA+ sexuality subgroups, contrasting previous studies. For example, Feinstein et al. (2020) found that bisexual+ participants were significantly more anxious and depressed than gay and lesbian participants.

We found no significant differences in body appreciation between groups, similar to previous research which compared women of diverse sexual orientations (Ramseyer Winter et al., 2015) but contrasting

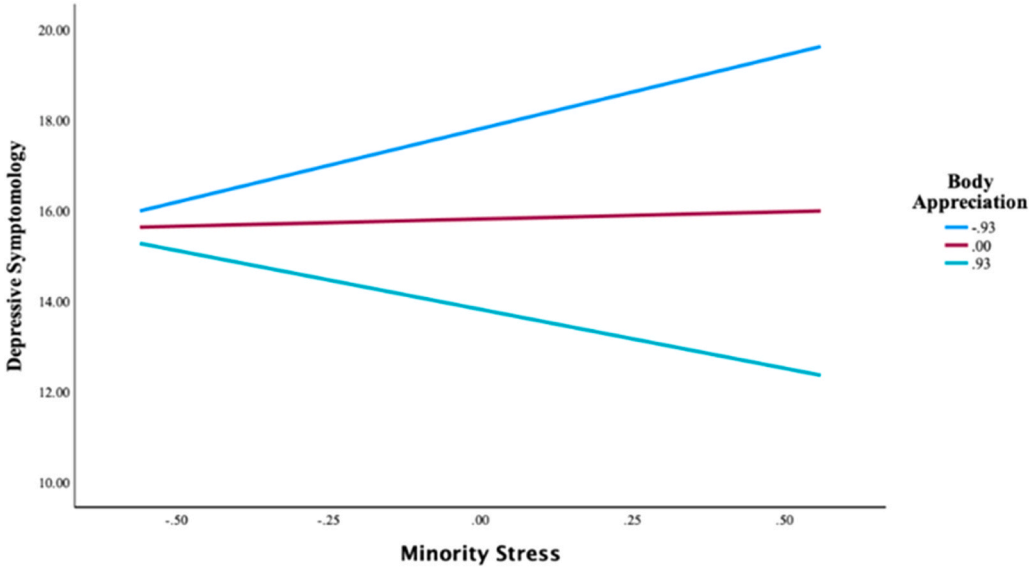

Fig. 2. Conditional effect of minority stress on depressive symptomatology scores at −1 SD, Mean and 1 SD of body appreciation (coloured lines) at the mean level of self-esteem.

Table 4
Full bootstrap regression results for both the a-path (from minority stress to appearance anxiety) and for the b-/c'-path (from minority stress to depressive symptoms).

	Model a-path			Model b/c' path		
Variable	*b*	*SE*	*CI*	*b*	*SE*	*CI*
MSM	3.12	.77	1.63 – 4.63	0.32	.69	−.97 – 1.73
PASTAS				0.12	.06	−.00 –.24
BAS−2				−2.14	.66	−3.44 – −.91
MSM X BAS−2				−3.13	1.05	−5.17 – −1.03
PASTAS X BAS−2				−0.03	.08	−.18 –.14
RSES				−1.10	.08	−1.27 – −.95
MSM X RSES				0.23	.15	−.07 –.51
PASTAS X RSES				−0.02	.01	−.04 –.00

Note. $N = 382$. The model for b- and c'-path was significant ($R^2 = .66$, $F(8, 373) = 105.71$, $p < .001$). BDI – Beck's Depression Inventory; BAS-2 – Body Appreciation Scale-2; PASTAS – Physical Appearance State and Trait Anxiety Scale – 8 items of state scale measuring body appearance anxiety; RSES – Rosenberg Self-esteem Scale; MSM – Minority Stress Measure.

Richburg and Stewart (2024), who found that cis binary participants had lower body appreciation than trans binary and nonbinary participants. It is important to note, however, that these studies considered differences either by participants' gender or their sexual orientation, not the intersection of both as we have done in the current study.

4.1. Moderated mediation model findings

We did not find full statistical support for our moderated mediation model. However, the model indicated that greater minority stress was significantly associated with increased body appearance anxiety. This is consistent with our hybrid conceptualisation of the tripartite influence and minority stress models, through which greater minority stress increases vulnerability to pressure from gender-stereotyped appearance ideals, leading to increased appearance anxiety. Furthermore, this finding supports similar prior research, for example, Kimmel and Mahalik (2005) found that minority stress increased body dissatisfaction among gay men, and in their review, Parker and Harriger (2020) identified minority stress as a key determinant of poor body image. This has been explained through a mechanism in which constant minority stress erodes LGBTQIA+ individuals' capacity to resist appearance-ideal internalisation (Pullmer et al., 2021). While in our model, minority stress did not directly predict depressive symptoms, the interaction between minority stress and body appreciation indicated that the relationship between them was significantly moderated by body appreciation; when body appreciation was higher, depressive symptoms were lower, particularly with increasing minority stress.

This finding also suggests, as hypothesised via our hybrid theoretical model, that body appreciation has a protective effect on the relationship between experienced societal stressors and depressive symptoms. This is consistent with prior research, which found that body appreciation protected against depression among racially and ethnically diverse women (Ramseyer Winter et al., 2019) and among lesbian, gay and queer women (Burnette et al., 2019). As such, our findings add to the research on body appreciation as a protective mechanism among people of diverse sexual orientations and gender identities (Linardon et al., 2022), which could aid clinicians and mental health professionals in supporting LGBTQIA+ people and help inform intervention work to protect and improve psychological wellbeing.

Unlike body appreciation, self-esteem did not significantly moderate the direct pathways between minority stress and appearance anxiety or depression, demonstrating that in our sample self-esteem did not play a protective role in reducing the impact of experienced societal hostility on appearance anxiety or psychological wellbeing - measured here as depressive symptoms. However, the indirect effect of appearance anxiety was present when self-esteem and body appreciation were low, which suggests an extra vulnerability to impacts of minority stress on psychological wellbeing among individuals who lack these 'buffers'. Findings from prior research on the relationship between self-esteem and minority stress have not been conclusive, with some studies finding that self-esteem was significantly associated with minority stress (Velez et al., 2015), while others found no such relationship (Swim et al., 2009). That self-esteem did not appear to offer protection against depressive symptoms within our hybrid model is unexpected, however, this may be explained by the specific facet of self-esteem we measured. So-called 'state' or 'social' self-esteem are influenced by day-to-day experiences of minority stressors while 'global' self-esteem is less impacted (Swim et al., 2009). Given that the present study utilised a measure of general, rather than state or social self-esteem (i.e., the Rosenberg Self-Esteem Scale), this may explain why self-esteem was not a

significant moderator on direct pathways within our model.

4.2. Study strengths

The present study contributed to the literature in several ways. Firstly, we considered the intersecting gender and sexual orientation identities of our participants when measuring experienced minority stress, aspects of body image, and depression. Moreover, as suggested by Zullig et al. (2019), this study measured the experiences of individuals attracted to nonbinary and multiple genders - plurisexual identities who are underrepresented in the research (Hayfield & Křížová, 2021).

Secondly, our findings support previously published research in demonstrating that people in the LGBTQIA+ community experience lower body appreciation and self-esteem and more body appearance anxiety and depressive symptoms than cishet people. We also showed that within our LGBTQIA+ sample, there were differences between sexual orientation identities in levels of experienced stress from structural societal discrimination, hostility, and bias. Gaining a nuanced understanding of societal impacts on diverse LGBTQIA+ identities is important to be able to most effectively tackle poorer health outcomes among the most vulnerable or at-risk groups (Fredriksen-Goldsen et al., 2014).

Lastly, using a novel combination of theoretical models, we found that body appreciation had a significant and positive role in lowering the impact of minority stress on the likelihood of depressive symptomatology, both directly and indirectly, among LGBTQIA+ people. This has implications for the development of interventions and treatments. Future work should assess whether existing interventions aimed at improving wellbeing are appropriate for LGBTQIA+ identities and consider including specific support related to improving body appreciation. Targeted interventions for LGBTQIA+ individuals with lower body appreciation may reduce susceptibility to the impacts of minority stress, appearance anxieties and poorer mental health outcomes.

4.3. Limitations and future directions

We acknowledge the current research has some limitations. Larger subgroup samples would have allowed us to run separate mediation moderation analyses, as there may be nuances in the relationships between minority stress and psychological wellbeing among people of different gender and sexual orientation identities. Moreover, our sample was taken from a non-clinical population; future studies should examine the utility of our model among people of diverse gender and sexual orientation identities with a diagnosis of depression. Our data were cross-sectional, and as such causal relationships between our measured societal stressors and participants' psychological wellbeing cannot be confirmed. Future studies are needed to carry out longitudinal work (O'Laughlin et al., 2018).

Some participants in our sample ($n = 29$) indicated they were both asexual and attracted to other genders. For the purposes of the current study, self-reported asexuality took primacy over other attraction information, as this could have referred to romantic rather than sexual attraction (we did not stipulate). Romantic attraction may be less stable than sexual attraction among some sexual orientation identities (Su & Zheng, 2023), so it is important to clearly establish which kind of attraction is being measured. Furthermore, while asexuality may be standardly defined as the absence of sexual attraction, lived experiences of it vary; for example, some asexual people do not have sex, some do, and some have romantic relationships (Brunning & McKeever, 2021). We recommend future research investigate romantic attraction as well as sexual attraction in LGBTQIA+ identities, including asexual individuals, as they may inform on psychological wellbeing in differing ways (DeLuzio Chasin, 2011).

In the present study, bisexual people (i.e., attracted to both binary genders) experienced significantly less minority stress than gay men and lesbian women (i.e., individuals only attracted to the same binary gender) and individuals attracted to nonbinary or multiple genders. Further research is warranted to understand differences in experiences and impacts of both distal and proximal stressors, particularly among polysexual people.

Future studies could seek to further understand the relationships between our variables using other research methods. For instance, qualitative work would allow a more in-depth understanding of these relationships among different LGBTQIA+ identities, which could help refine the sociocultural model presented here. Moreover, it may be more appropriate to measure context-specific components of self-esteem, rather than general self-esteem as we did in our study. As Swim et al. (2009) suggest, social self-esteem may be more directly influenced by minority stress; as such it is more appropriate for understanding its potential buffering effects on depression, both directly and indirectly through appearance anxiety. The present study utilised a state version of the measure of appearance anxiety. We recognise that there may be an argument for utilising measures within a study that all reflect the same temporal context (i.e., all trait or all state). Some authors suggest that homogenising the temporal nature of measures used strengthens the inferences drawn from results (Kenny & Zautra, 2001). Nevertheless, in our sample, PASTAS state scores were significantly correlated with the other variables in the directions and to the degrees one would expect, so it is unlikely that using the trait version would have resulted in a completely different pattern of results.

While it was not in the scope of the present study, other demographic factors may help explain more fully the impacts of minority stressors on the psychological outcomes we examined in our model (e.g., socioeconomic background, weight, health status, race, and ethnicity). It has also been suggested that the variability of outcomes - including depression - among diverse gender and sexual identities could be due to differences in factors such as social support and access to gender-affirming health care (Scandurra et al., 2019). Future studies could take a broader intersectional approach by incorporating such factors into explanatory models.

4.4. Conclusion

The present study supports existing evidence that compared to cisgender heterosexual individuals, sexual orientation and gender diverse individuals experience poorer mental health outcomes in the form of more depressive symptoms and appearance anxiety and lower body appreciation and self-esteem. Moreover, our model showed that LGBTQIA+ individuals with low levels of body appreciation and self-esteem are vulnerable to appearance anxiety and associated depression from experienced minority stress. Lastly, we found clear support for the protective effect of body appreciation in the relationship between minority stress and depression. Our findings have implications for the development of strategies and interventions to tackle depression among people of diverse gender and sexual orientations.

CRediT authorship contribution statement

Joel Bates: Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Nadia Maalin:** Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Tracey Thornborrow:** Writing – original draft, Supervision, Methodology, Data curation, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data Availability

Data will be made available on request.

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