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Review article

Body image disturbance and sexual orientation: An updated systematic review and meta-analysis

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ABSTRACT

Negative body image, or body image disturbance (BID) has been associated with depression, low self-esteem, and the development of eating disorders. Furthermore, BID may affect an individual regardless of gender or sexual orientation. To synthesise the current literature, we conducted a meta-analysis of 48 studies to determine if BID differed between lesbian versus heterosexual women, lesbian women versus gay men, and gay versus heterosexual men. Body image measures were grouped according to similarities in constructs measured, resulting in five different categories (global satisfaction, figural-rating scales, cognitive measures, affect measures, and male body image). The results indicated that lesbian women reported experiencing less BID compared to heterosexual women on measures of global satisfaction, but more compared to gay men, and gay men reported experiencing greater BID compared to heterosexual men on three out of five analyses. Moderation analyses indicated that the study quality was not a statistically significant moderator of the effect sizes. Results from this updated meta-analysis indicate that, to some degree, BIDs affect individuals regardless of gender and sexual orientation; however, there is some variability associated with sexual orientation.

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1. Introduction

Body image is a general term that refers to how an individual perceives, feels, and thinks about their body. The concept of negative body image, or body image disturbance (BID), refers to high body dissatisfaction, drive for thinness, and appearance evaluation, low weight satisfaction, and poor body size perception accuracy (Grogan, 2010). BID has been associated with low self-esteem, depression, and the development of eating disorders (Alvy, 2013). Body image concepts sit along a continuum that may range from low severity up to extreme BID. For example, body satisfaction may be considered at the low severity/positive end of a body (dis)satisfaction continuum.

Sexual orientation is occasionally considered in relation to BID, yet results are often mixed and inconsistent (Polimeni, Austin, & Kavanagh, 2009). To synthesise the literature on sexual orientation and BID, Morrison, Morrison, and Sager (2004) conducted a meta-analysis and found a trivial effect size (d = -0.02) when comparing heterosexual and lesbian women on body satisfaction, and found that lesbian women reported being slightly more satisfied with their bodies. The authors suggested there were no meaningful differences between the two groups due to the trivial effect size and because the confidence intervals (CI) included zero (-0.23, 0.20). Comparing gay and heterosexual men, gay men reported statistically significantly more body satisfaction (d = 0.29, p < .001).

Objectification theory (Fredrickson & Roberts, 1997) is a theoretical framework that has been suggested to assist in explaining the reported differences in the literature comparing BID in lesbian and heterosexual women, and gay and heterosexual men. Objectification theory posits that, in Western cultures, women's bodies are considered objects for the pleasure of, and consumption by, men. Objectification leads to self-objectification, whereby women evaluate their own bodies in terms of attraction to others (usually at an unattainable standard), which causes body shame (Fredrickson, Hendler, Nilsen, O'Barr, & Roberts, 2011). It is this body shame that leads to body dissatisfaction, a component of BID, and extensive research has demonstrated the link between self-objectification and body dissatisfaction (Rolnik, Engeln-Maddox, & Miller, 2010; Tiggemann & Lynch, 2001).

Culturally bound validated definitions of what is desirable/attractive play an important part in body image development. These culturally bound definitions of desirableness/attractiveness include perception of the cultural standards, perception of the extent to which people perceive themselves to match that standard, and how much importance the culture places on individuals matching the standard (Fallon, 1990). This framework is often cited to explain why lesbian women experience BID to a similar degree as heterosexual women, because both groups of women are born and raised in the same society (see Dworkin, 1989; Hill & Fischer, 2008); multiple studies support the suggestion that lesbian and heterosexual women experience BID similarly (Morrison & McCutcheon, 2012; Peplau et al., 2009; Strong, Williamson, Netemeyer, & Geer, 2000).

In contrast, objectification theory is also cited as to why lesbian women may experience less BID than heterosexual women. Combined with objectification theory, the protective hypothesis (Brown, 1987) posits that, because lesbian women reject the heteronormative standards of attractiveness and are, presumably, less concerned with attracting a male, they are less influenced by oppressive heteronormative beauty standards and instead adopt norms surrounding body acceptance, especially in terms of larger-sized bodies. This rejection of mainstream norms and ideals potentially provides a protective factor that results in lesbian women to experience less BID than heterosexual women (Beck, 2017). Research supports the protective hypothesis for lesbian women relating to components of BID: body dissatisfaction (Alvy, 2013; Polimeni et al., 2009), negative attitudes towards eating and weight (Owens, Hughes, & Owens-Nicholson, 2003), and negative peer appearance pressure (Hazzard et al., 2019).

Although objectification theory relates to the sexualisation of a woman's body, researchers have proposed that gay men also experience self-objectification and therefore BID as a result (Davids, Watson, Nilsson, & Marszalek, 2015). Multiple studies have identified that members of the gay community are much more appearance focused compared to heterosexual men, with previous research reporting that greater involvement in the gay community was associated with increased levels of perceptual distortion (Tiggemann, Martins, & Kirkbride, 2007) and body dissatisfaction (Kousari-Rad & McLaren, 2013). Researchers have found that men, regardless of sexual orientation, value attractiveness in a partner (Moreno-Dominguez, Raposo, & Elipe, 2019), indicating that gay men could experience self-objectification due to an increased pressure to appear attractive to their potential male partners. Self-objectification has also been specifically studied across multiple samples of gay men, and the results have consistently shown that gay men report experiencing self-objectification, body shame, and body dissatisfaction (Tiggemann et al., 2007; Wiseman & Moradi, 2010).

Furthermore, Duggan and McCreary (2004) found that gay men displayed greater instances of maladaptive eating attitudes/behaviours compared to heterosexual men; that is, gay men reported greater instances of negative, thinness-orientated eating behaviours and attitudes. Additionally, gay men in Rothblum's (2002) study were less satisfied with their upper torso strength and condition, experienced a larger gap between their ideal and actual bodies, and placed greater importance on physical appearance compared to heterosexual men, suggesting that gay men are similar to heterosexual women in terms of BID. These findings were empirically supported in Morrison et al.'s (2004) meta-analysis; gay men were similar to heterosexual women on measures of body satisfaction. Researchers suggest that, compared to heterosexual men, gay men, lesbian and heterosexual women all experienced more BID (Peplau et al. (2009); however, there is little research available specifically comparing gay men and lesbian women.

The last systematic review and meta-analysis on this topic was conducted almost two decades ago; it is important to keep meta-analyses as up to date as possible to ensure future researchers have access to the most recent and relevant findings (Cumpston & Chandler, 2019). Considering the breadth and depth of literature on sexual orientation and BID, especially the divisive research on lesbian and heterosexual women's BID, this updated meta-analysis is an important addition to the current literature; this meta-analysis

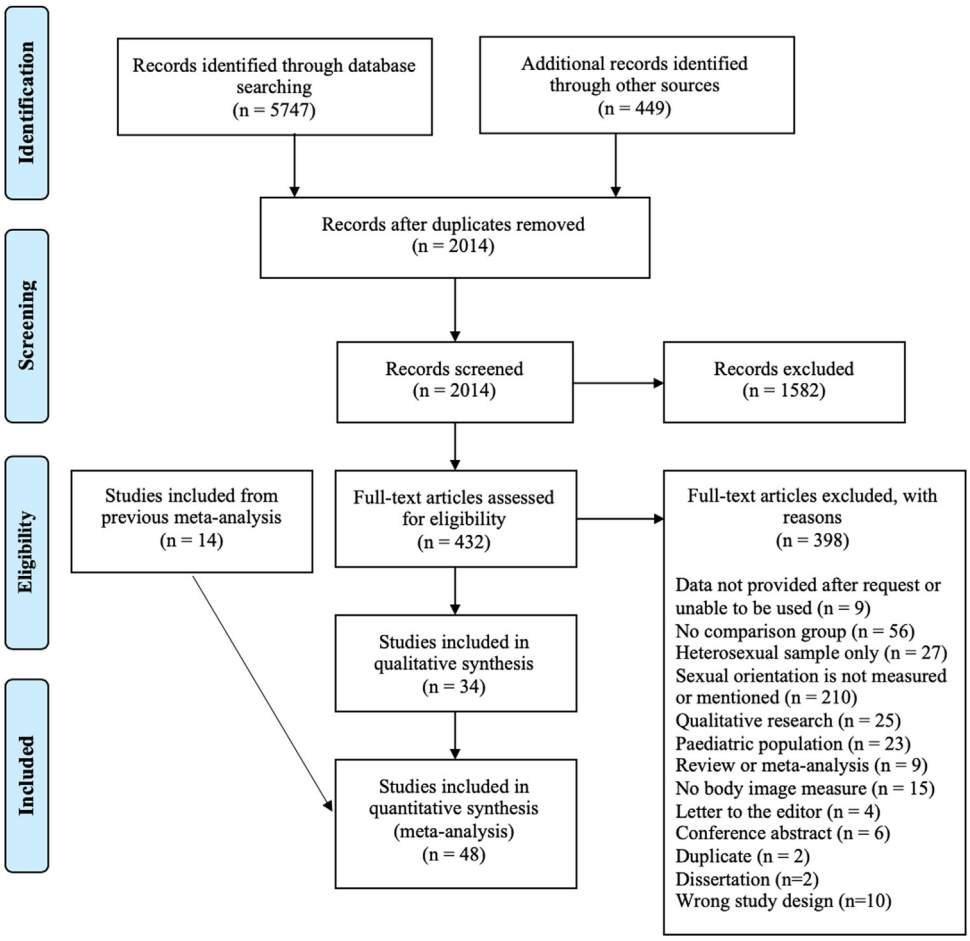

Fig. 1. PRISMA flow diagram illustrating the selection of articles for the meta-analysis.

will add to the growing body of knowledge of whether differences in BID exist between people of different sexual orientations. The knowledge that BID affects people of differing sexual orientations i.e., gay men, heterosexual men, lesbian and heterosexual women, in the same, or differing ways, has critical implications for the treatment of and risks for developing eating disorders, eating dysfunction, and psychological distress (Thompson, 2000).

Because there are still many unanswered questions surrounding BID literature in terms of sexual orientation, the aim of this study was to synthesise the available research on BID in sexual minority and heterosexual men and women. The search of literature began from the time point that Morrison et al. (2004) ceased their data collection but included studies and data from their meta-analysis. This systematic review and meta-analysis will update the existing literature to determine if the results found in M. A. Morrison's study are still supported with the inclusion of more recent studies. We aimed to compare differences across all BID measures between lesbian and heterosexual women, and gay and heterosexual men, and answer the following research question:

Do lesbian women and gay men report experiencing the various BID constructs similarly (or differently) to heterosexual women, and to heterosexual men, respectively? A further exploratory aim of this study was to compare BID scores between gay men and lesbian women. If there were studies found through the systematic search that allowed for comparison between gay men and lesbian women, we would examine these comparisons.

The assessment of the quality of a study included in systematic reviews and/or meta-analyses is a recommended practice, as poor-quality studies can overestimate or underestimate the effects and lead to bias in the results (Boutron et al., 2019). As such, in addition to conducting quality assessments of the included studies, we wanted to determine if the quality of a study moderated the effect sizes of the comparisons.

2. Method

2.1. Design

This study was conducted according to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines (Liberati et al., 2009), and identified studies that compared BID of lesbian and heterosexual women, gay and heterosexual men, or lesbian women and gay men. The search identified relevant studies that met the criteria described below.

2.1.1. Inclusion criteria

We included studies that (a) used a measure of BID; (b) permitted comparison between either heterosexual and lesbian women, and/or gay men and heterosexual men; and (c) provided relevant statistics of BID scores to allow calculation of effect size.

2.1.2. Exclusion criteria

We excluded studies that (a) did not contain a comparison group; (b) had no measure of BID; (c) were not published in English; (d) were not peer-reviewed; (e) were conference abstracts, case studies, or systematic reviews/meta-analyses; and (f) either reported insufficient results for the calculation of an effect size or results were not available from authors.

Table 1
Studies Included in the Meta-Analysis of Body Image and Sexual Orientation.

Study	Country	Comparison Group	Sexual Orientation Measurement	Age (M, SD or range)	BMI (M, SD or range)	Measure/s	*N*	Quality Rating
Alleva, Paraskeva, Craddock, and Diedrichs (2018)	GBR	HM and SMM	Demographic data question	39.13 (13.76)	25.74 (4.39)	BAS, MBSRQ DMS, DLS, SATAQ-3	HM (301) GM (114) BM (14) Other (3)	High
Alvy (2013)	USA	HW and LW	Demographic data question	47.59 (7.34) 34–65	Not reported	FRS, EDI-2-BD, MBSRQ	HW (400) LW (479)	High
Antfolk, Ålgars, Holmgård, and Santtila (2017)	FIN	HM and GM, HW and LW	Demographic data question	Men = 26.2 (4.8) Women = 26 (5.1)	HM = 24.63 (3.56) GM = 24.01 (3.46) HW = 23.00 (4.06) LW = 23.12 (4.26)	DSFI-BI	HM (2441) GM (230) HW (4610) LW (726)	Medium
Basabas, Greaves, Barlow, and Sibley (2019)	NZL	HM and GM, HW and LW	Demographic data question	49.17 (13.70)	27.36 (5.95)	Single question about satisfaction with appearance, shape, and size of body	HM (6050) GM (236) HW (9953) LW (196)	Medium
Beren, Hayden, Wilfley, and Grilo (1996)*	USA	HM and GM, HW and LW	Kinsey Scale	HM = 18.79 (1.12) GM = 30.26 (11.16) HW = 18.42 (0.92) LW = 34.91 (9.59)	HM = 22.65 (3.07) GM = 25.32 (4.75) HW = 21.08 (3.02) LW = 27.18 (15.80)	FRS, BSQ, EDI-BD	HM (25) GM (58) HW (72) LW (69)	Low
Bergeron and Senn (1998)*	CAN	HW and LW	Demographic data question	HW = 34.41 (9.26) LW = 32.75 (7.76)	HW = 17.60 (3.02) LW = 18.01 (2.85)	BAQ, SATAQ	HW (116) LW (108)	Medium
Boroughs and Thompson (2002)*	USA	HM and GM	Not reported	Not reported	Not reported	MBSRQ-BASS, CDS	HM (47) GM (15)	Low
Calzo, Austin, and Micali (2018)	GBR	HM and GM, HW and LW	Modified Kinsey Scale	16	Not reported	BDS, pressure to increase muscle (male only)	HM (2161) GM (60) HW (2313) LW (73)	Low
Carper, Negy, and Tantleff-Dunn (2010)	USA	HM and GM	Kinsey Scale	19.31 (0.89)	Not reported	SATAQ-3, PASTAS	HM (39) GM (39)	Medium
Conner, Johnson, and Grogan (2004)	GBR	HM and GM, HW and LW	Demographic data question	HM = 23.1 (3.27) GM = 23.9 (4.41) HW = 21.4 (2.0) LW = 23.2 (2.88)	HM = 24.6 (2.28) GM = 22.5 (2.77) HW = 21.0 (2.39) LW = 22.4 (1.81)	FRS	HM (30) GM (28) HW (33) LW (30)	Low
Dakanalis et al. (2012)	ITA	HM and GM	Kinsey Scale	HM = 20.70 (1.30) GM = 20.89 (1.01)	HM = 24.49 (3.66) GM = 23.91 (4.40)	OBCS	HM (130) GM (125)	Low
Davids and Green (2011)	USA	HM and GM, HW and LW	Demographic data question	HM = 23.74 (7.08) GM = 26.28 (8.53) HW = 25.23 (9.72) LW = 26.00 (7.54)	HM = 24.63 (5.37) GM = 25.25 (5.69) HW = 26.09 (7.30) LW = 28.08 (8.26)	BSQ, DMS	HM (34) GM (96) HW (82) LW (51)	High
Duggan and McCreary (2004)	CAN	HM and GM	Not reported	Not reported	Not reported	DMS, SPAS	HM (29) GM (67)	Low
Frederick, Sandhu, Morse, and Swami (2016)	USA	HM and GM, HW and LW	Demographic data question	HM = 50.1 (10.8) GM = 47.2 (11.1) HW = 45.4 (11.8) LW = 47.1 (10.8)	HM = 29.1 (5.3) GM = 27.5 (5.2) HW = 27.2 (6.2) LW = 29.0 (6.9)	Likert-type item about 1) Physical Appearance and 2) Weight	HM (2756) GM (402) HW (8686) LW (142)	Medium
Frederick et al. (2020)	USA	HM and GM, HW and LW	Not reported	HM = 46 (15) GM = 49 (14) HW = 48 (15) LW = 43 (16)	Not reported	Likert-type item about appearance happiness	HM (2856) GM (279) HW (3140) LW (78)	Low
			Not reported	HM = 50 (12) GM = 46 (13) HW = 46 (12) LW = 39 (13)	Not reported	Likert scale about satisfaction with body, weight, and muscle tone/size	HM (379) GM (215) HW (555) LW (209)	

Table 1 (*Continued*)

Study	Country	Comparison Group	Sexual Orientation Measurement	Age (M, SD or range)	BMI (M, SD or range)	Measure/s	*N*	Quality Rating
Fussner and Smith (2015)	USA	HM and GM	Kinsey Scale	20.46 (3.22)	Not reported	BIG-O, EDE-Q	HM (128) GM (73)	Medium
Gettleman and Thompson (1993)*	USA	HM and GM, HW and LW	Demographic data question	HM = 25.06 (8.15) GM = 25.41 (5.81) HW = 25.59 (8.41) LW = 27.25 (6.72)	Not reported	MBSRQ	HM (32) GM (32) HW (32) LW (32)	Medium
Gigi, Bachner-Melman, and Lev-Ari (2016)	ISR	HM and SMM	Demographic data question	23.1 (1.9)	Not reported	BSQ, DMS, BIG-Fat, BIG-Muscle, SATAQ-3	HM (203) SMM (59)	Low
Gil (2007)	ISR	HM and GM	Kinsey Scale	26.9 (4.12) 18–35	HM = 24.51 (3.74) GM = 23.69 (5.5)	CDS	HM (105) GM (75)	Medium
Hazzard et al. (2019)	USA	HW and LW	Demographic data question	HW = 19.74 (2.00) LW = 18.39 (1.22)	HW = 22.83 (4.34) LW = 22.93 (4.32)	SATAQ-4, EDE-Q	HW (1528) LW (278)	Medium
Hausmann, Mangweth, Walch, Rupp, and Pope (2004)	AUT	HM and GM	Not reported	HM = 27.2 (3.7) GM = 28.2 (6.5)	Not reported	Somatomorphic Matrix - body fat and muscularity	HM (59) GM (37)	Medium
Henn, Taube, Vocks, and Hartmann (2019)	DEU	HW and LW	Demographic data question	HW = 24.84 (6.14) LW = 26.4 (9.21)	HW = 22.78 (7.19) LW = 23.95 (9.66)	BAS-2, BIDQ, CDS, DLS, DMS	HW (322) LW (180)	High
Jankowski, Diedrichs, and Halliwell (2014)	GBR	HM and GM	Demographic data question	28.83 (9.93) 18–69	HM = 23.79 (4.23) GM = 25.12 (5.25)	MBAS-R, MBSRQ, SATAQ-3	HM (78) GM (77)	High
Jones et al. (2019)□	USA	HW and LW	Demographic data question	18	**Black** HW = 26.85 (7.48) LW = 28.99 (8.13) **White** HW = 24.45 (5.14) LW = 26.78 (6.55)	BIM	**Black** HW = 445 SMW = 114 **White** HW = 323 SMW = 83	Medium
Kaminski, Chapman, Haynes, and Own (2005)	USA	HM and GM	Not reported	30.86 (7.35)	HM = 25.23 (3.25) GM = 22.77 (2.28)	MEBBIE	HM (25) GM (25)	Medium
Koff, Lucas, Migliorini, and Grossmith (2010)	USA	HW and SMW	Kinsey Scale	HW = 20.08 (1.37) SMW = 19.82 (1.20)	HW = 21.93 (2.56) SMW = 22.88 (3.53)	FRS	HW (95) SMM (85)	Medium
Lakkis et al. (1999)*	AUS	HM and GM, HW and LW	Kinsey Scale	HM = 24.90 (8.64) GM = 23–91 (6.83) HW = 21.82 (5.43) LW = 26.35 (6.11)	Not reported	EDI-BD	HM (60) GM (69) HW (73) LW (64)	Medium
LaTorre and Wendenburg (1983)*.	CAN	HW and LW	Demographic data question	Not reported	Not reported	Body-Cathexis Scale	HW (85) LW (18)	Low
Legenbauer et al. (2009)	DEU	HM and GM, HW and LW	Demographic data question	HM = 28.59 (5.82) GM = 28.96 (6.93) HW = 26.13 (5.15) LW = 29.11 (6.60)	HM = 23.55 (3.01) GM = 23.76 (3.92) HW = 22.41 (3.42) LW = 23.41 (3.66)	SATAQ-3, CDS	HM (61) GM (82) HW (67) LW (73)	Medium

Table 1 (*Continued*)

Study	Country	Comparison Group	Sexual Orientation Measurement	Age (M, SD or range)	BMI (M, SD or range)	Measure/s	*N*	Quality Rating
Markey, Gillen, August, Markey, and Nave (2017)	USA	GM and LW	Not reported	Not reported	GM = 26.28 (5.58) LW = 29.38 (8.23)	CDS	GM (72) LW (72)	Medium
McArdle and Hill (2009)	USA	HM and GM	Demographic data question	32.4 (11.68)	Not reported	MBSRQ	HM (54) GM (83)	Medium
Michaels, Parent, and Moradi (2013)	USA	HM and SMM	Demographic data question	19.41 (3.25) 18–51	Not reported	BISS, DMS, OBCS, SPAS	HM (42) SMM (29)	Low
Moreno-Dominguez et al. (2019)	ESP	HW and LW	Demographic data question	HW = 24.91 (0.57) LW = 26.47 (0.74)	HW = 24.40 (5.15) LW = 25.78 (6.51)	BSQ	HW (176) LW (78)	High
Owens et al. (2003)*	USA	HW and LW	Demographic data question	Mean ages between 39.7–45.8	HW = 28.2 LW = 29.6	Likert-type scale about body satisfaction	HW (279) LW (550)	Medium
Peplau et al. (2009)^	USA	HM and GM, HW and LW	Not reported	HM = 28.38 (9.55) GM = 34.98 (10.39) HW = 27.05 (8.85) LW = 29.59 (9.62)	HM = 26.19 (5.71) GM = 25.93 (5.34) HW = 25.10 (6.48) LW = 27.02 (7.19)	MBSRQ	HM (646) GM (130) HW (1619) LW (117)	Medium
			Not reported	HM = 36.9 (11.8) GM = 34.8 (10.2) HW = 33.5 (11.1) LW = 32.9 (11.1)	HM = 26.6 (4.1) GM = 25.4 (4.2) HW = 24.2 (4.8) LW = 25.4 (5.4)	Single items about attractiveness and comfort in a swimsuit	HM (25174) GM (1523) HW (26963) LW (655)	
Polimeni et al. (2009)	AUS	HW and LW	Demographic data question	HW = 24.8 (1.49) LW = 25.0 (1.36)	HW = 23.8 (5.15) LW = 24.2 (6.53)	Likert-type items about satisfaction with body weight and shape	HW (8526) LW (86)	High
Schneider, O'Leary, and Jenkins (1995)*	USA	HM and GM, HW and LW	Demographic data question	HM = 35.5 (7.1) GM = 36.0 (6.2) HW = 36.3 (6.7) LW = 34.6 (6.5)	HM = 24.5 (4.0) GM = 23.0 (2.8) HW = 23.1 (5.1) LW = 22.4 (2.6)	Likert-type items about body satisfaction and wanted weight change	HM (75) GM (49) HW (75) LW (25)	Medium
Share and Mintz (2002)*	USA	HW and LW	Demographic data question	24–52	HW = 24.16 (4.68) LW = 25.56 (4.40)	BES, SATAQ	HW (87) LW (57)	Medium

Table 1 (*Continued*)

Study	Country	Comparison Group	Sexual Orientation Measurement	Age (M, SD or range)	BMI (M, SD or range)	Measure/s	*N*	Quality Rating
Siever (1994)*	USA	HM and GM, HW and LW	Kinsey Scale	HM = 21.79 (6.75) GM = 25.78 (5.18) HW = 23.81 (9.48) LW = 28.13 (5.84)	HM = 21.79 (2.68) GM = 22.67 (3.29) HW = 22.04 (3.80) LW = 24.72 (6.55)	BES, BSD, BSQ, EDI-BD	HM (63) GM (59) HW (62) LW (53)	Low
Shepler et al. (2018)	USA	GM and LW	Not reported	GM = 29.72 (5.85) LW = 29.73 (6.71)	Not reported	MBSRQ-AE	GM (88) LW (62)	Medium
Silberstein, Mishkind, Striegel-Moore, Timko, and Rodin (1989)*	USA	HM and GM	Not reported	HM = 23.08 (4.56) GM = 24.2 (4.04)	Not reported	BES, FRS	HM (71) GM (71)	Low
Smith et al. (2011)	USA	HM and GM	Kinsey Scale	20.49 (3.27)	Not reported	BIG, MBAS, EDE-Q-4	HM (129) GM (75)	Low
Striegel-Moore, Tucker, and Hsu (1990)*	USA	HW and LW	Kinsey Scale	HW = 19.60 (1.47) LW = 20.00 (1.10)	Not reported	BES, EDI-BD	HW (27) LW (25)	Low
Strong et al. (2000)*	USA	HM and GM, HW and LW	Kinsey Scale	HM = 22.24 GM = 23.10 HW = 21.65 LW = 23.32	HM = 25.34 (4.21) GM = 23.25 (3.64) HW = 21.48 (3.09) LW = 23.08 (4.07)	BSQ, PRFQ	HM (95) GM (103) HW (112) LW (82)	Medium
Swami (2009)	GBR	GM and LW	Demographic data question	GM = 30.43 (10.29) LW = 28.71)10.03)	Not reported	EPA	GM (93) LW (140)	Medium
Tiggemann et al. (2007)	AUS	HM and GM	Kinsey Scale	HM = 30.79 (9.19) GM = 34.10 (11.70)	HM = 25.66 GM = 25.20	FRS	HM (119) GM (134)	Low
Yelland and Tiggemann (2003)*	AUS	HM and HM	Kinsey Scale	HM = 33.6 (15.4) GM = 32.7 (15.8)	HM = 25.19 (5.49) GM = 23.55 (4.11)	BES, Likert-type items, EDI-BD, DMS	HM (51) GM (52)	Low
Yean et al. (2013)	USA	HM and GM, HW and LW	Kinsey Scale	21.23 (5.56) 18–60	HM = 24.12 (3.91) GM = 23.28 (4.62) HW = 22.87 (4.84) LW = 25.35 (7.12)	BSQ, EDI, DMS, SATAQ	HW (130) GM (116) HW (361) LW (96)	High

Note. For studies that combined sexual minorities together the group contained both lesbian and bisexual women, or gay and bisexual men. Where possible, we reported the age and BMI of each comparison group separately; however, not all studies reported these data, so in those instances we included the data for the whole group. AUS = Australia, AUT = Austria, BAS = Body Appreciation Scale, BAS-2 = Body Appreciation Scale – 2, BAQ = Body Attitudes Questionnaire, BDS = Body Dissatisfaction Scale, BES = Body Esteem Scale, BIDQ = Body Image Disturbance Questionnaire, BIG-O = Bodybuilder Image Grid – Discrepancy Score Overall, BIG-Fat = Bodybuilder Image Grid – Body Fat, BIG-Muscle = Bodybuilder Image Grid – Muscle, BIM = Body Image Measure, BISS = Body Image States Scale, BSQ = Body Shape Questionnaire, BSD = Body Size Drawings, CAN = Canada, CDS = Contour Drawing Scale, DEU = Germany, DMS = Drive for Muscularity, DSFI-BI = Derogatis Sexual Functioning Inventory – Body Image Subscale, DLS = Drive for Leanness, EDE-Q-4 = Eating Disorder Examination Questionnaire – 4, EDI = Eating Disorder Inventory, EDI-BD = Eating Disorder Inventory – Body Dissatisfaction Subscale, EDI-2-BD = Eating Disorder Inventory – 2 – Body Dissatisfaction Subscale, EPA = Estimating Physical Attractiveness Scale, ESP = Spain, FIN = Finland, FRS = Figure Rating Scale, GBR = United Kingdom, GM = Gay Men, HM = Heterosexual Men, HW = Heterosexual Women, ISR = Israel, ITA = Italy, LW = Lesbian Women, MBAS = Male Body Attitudes Scale, MBAS-R = Male Body Attitudes Scale – Revised, MBSRQ = Multidimensional Body-Self Relation Questionnaire, MBSRQ-AE = Multidimensional Body-Self Relation Questionnaire – Appearance Evaluation, MBSRQ-BASS = Multidimensional Body-Self Relation Questionnaire – Body Area Satisfaction Scale, MEBBIE = Male Eating Behaviour and Body Image Evaluation, NZL = New Zealand, OBCS = Objectified Body Consciousness Scale, PASTAS = Physical Appearance State and Trait Anxiety Scale, PRFQ = Psychosocial Risk Factor Questionnaire, SATAQ = Sociocultural Awareness Towards Appearance Questionnaire, SATAQ-3 = Sociocultural Awareness Towards Appearance Questionnaire – 3, SATAQ-4 = Sociocultural Awareness Towards Appearance Questionnaire – 4, SPAS = Social Physique Anxiety Scale, SMM = Sexual Minority Men, SMW = Sexual Minority Women, USA = United States of America.

^ Frederick et al. (2020) and Peplau et al. (2009) contained two studies with different data and participants.

□ Jones et al. (2019) reported data separately for Black and White women.

* Study from Morrison et al.'s (2004a) meta-analysis.

2.2. Procedure

We conducted a systematic search in June 2020 of the PsycINFO, Medline, PubMed, and EMBASE databases. The search strategy encompassed the following terms: body image AND male homosexuality, female homosexuality, lesbian, gay men, homosexuality, sex roles, psychosexual behavi*, sexual minorities, and sexual orientation. We used the same search terms as did Morrison et al. (2004); however, we included the additional terms of sexual minorities and sexual orientation. We only searched for articles published after December 2002 because Morrison et al. (2004) noted that their search encompassed studies up until that date. The studies from the original meta-analysis that met our inclusion criteria were included in the meta-analysis. We also conducted a key word search of the following journals: *Body Image: An International Journal of Research*, *Journal of Homosexuality*, and the *Psychology of Men and Masculinity*.

2.2.1. Data screening

We first imported search results into EndNote for duplicate removal and used Covidence Systematic Review Software (Covidence, 2019) for sorting and screening results. The first author screened the titles and abstracts to determine articles for inclusion. The remaining articles were selected for full-text screening. The articles that still met the inclusion criteria were then selected for data-extraction. Of the studies selected for data-extraction, the first author searched the reference lists to ensure that no studies were missed for the meta-analysis. From this approach, one additional study was found (Davids & Green, 2011). The fourth author assisted with the data-collection and quality assessment of each article to ensure the accuracy of the data collected. Missing data were requested from the authors, and the authors were advised that if the requested data were provided within three weeks, the study would be included in the meta-analysis. Data requests were sent to nine authors, and two responded with the requested data (Shepler, Smendik, Cusick, & Tucker, 2018; Tiggemann et al., 2007); three authors responded that they were unable to provide the requested data, and the rest did not respond; therefore the articles could not be included. See Fig. 1 for a PRISMA flow diagram of the search strategy.

2.2.2. Data extraction

The data extracted from each study were, where applicable, year published, country, study design, comparison group(s), how sexual orientation was measured, ethnicity of participants, BID measure, age of participants, number of participants in each group, average BMI of each group, and statistics for the calculation of an effect size.

2.2.3. Description of data

In total, there were 48 studies comprising 126,268 participants. Of these studies, 35 were found from the most recent systematic search, and 14 were from the original meta-analysis (Morrison et al., 2004). There were four studies from the original meta-analysis that did not meet our inclusion criteria and were therefore excluded from the analyses.

We conducted three analyses comparing lesbian and heterosexual women, five analyses comparing gay and heterosexual men, and two analyses comparing lesbian women and gay men. Table 1 displays a summary of the descriptive characteristics of the studies included in the meta-analysis.

A common pitfall with conducting a meta-analysis is trying to compare "apples and oranges" (Esteves, Majzoub, & Agarwal, 2017, p. S412). This means that there are high levels of heterogeneity among the studies on one or more study variables e.g., sample, methodology, or outcome measure, adding to uncertainty in the results. After extracting the data from the included studies, we concluded that combining all the studies together would be poor practice due to the variance in the way BID was measured. To overcome this issue, we grouped the studies according to the type of BID measure. Cash (2011) outlined that there are many different measures used to assess BID and advised that researchers should take careful consideration when deciding which one to use for their research. Accordingly, we used the recommendations of Menzel, Krawczyk, and Thompson (2011); Shroff, Calogero, and Thompson (2009) and Thompson, Burke, and Krawczyk (2012) to appropriately group the different BID measures. Table 2 details how we grouped the measures according to their type.[1]

Most of the studies were conducted in Western countries and the samples from those studies were mostly university (college) students. We note that the lack of differing countries, and therefore ethnicities and races, of the participants means there is a strong bias in the results towards white, college/university aged individuals. The most common methods of assessing sexual orientation were use of the Kinsey Scale (Kinsey, Pomeroy, & Martin, 1948), or a modified version of it, or just a basic demographic data question. We were, unfortunately, unable to use the measure of sexual orientation as a moderator of the analyses. It is interesting to note that in quite a few of the older studies, key demographic data (e.g., age, BMI) and how sexual orientation was assessed, were not reported.

2.3. Statistical analysis

We used Comprehensive Meta-Analysis (CMA) version 3 (Biostat, 2017) to conduct the meta-analysis. We calculated standardised effect sizes by computing the standard error and variance for each study, using formulae that were specific to the type of data entered to calculate the effect size. The standardised mean difference was calculated by dividing the difference between one group mean and the comparison group mean by the pooled SD. Using the method suggested by Borenstein, Hedges, Higgins, and Rothstein (2009), the weighting for each study was further calculated based on the inverse of the variance. We calculated the standardised effect sizes relating to the mean body image score. The mean effect sizes for each comparison group were calculated, which represented the magnitude of the difference in scores between the groups. To avoid violating the assumption that effect sizes included in the analyses were independent from each other, we averaged the effect sizes for studies that included multiple effect sizes from multiple measures (Card, 2012; Lipsey & Wilson, 2001). Due to the small number of participants in most of the studies and comparisons, we chose Hedges's *g* as a more conservative measure of effect size and we used 95 % CI to identify statistical significance. The *g*-value indicators were used as per Cohen (1992) with .20, .50, and .80 indicating a small, medium, and large effect respectively. Additionally, we deemed an effect of .10 as trivial, as per Hyde (2005). We conducted random-effects analyses due to the assumed heterogeneity between the studies, as there were varying types of participants, BID measure used, and study methodologies (Borenstein et al., 2009). We calculated the intraclass correlation coefficient on the results of the quality assessment that the first and fourth author conducted on each of the studies. We used an averaged measure, absolute-agreement, two-way random-effects model (Koo & Li, 2016; McGraw & Wong, 1996).

2.3.1. Moderation analyses

To determine if we needed to conduct any moderator analyses, we tested homogeneity using the Q-statistic. We quantified

[1] The authors acknowledge that the measures included in the meta-analysis are by no means inclusive of all the measures available for assessing body image disturbance.

Table 2
Grouping of Body Image Disturbance Measures.

Name of Comparison	Measure	Author(s)
Global satisfaction	Body Appreciation Scale	Avalos, Tylka, and Wood-Barcalow (2005)
	Body Appreciation Scale – 2	Tylka and Wood-Barcalow (2015)
	Body Attitudes Questionnaire	Ben-Tovim and Walker (1991)
	Body Dissatisfaction Scale	Stice (2001)
	Body-Cathexis Scale	Secord and Jourad (1953)
	Body Esteem Scale	Franzoi and Sheilds (1984)
	Body Image Disturbance Questionnaire	Cash, Phillips, Santos, and Hrabosky (2004)
	Body Image Self-Consciousness Scale – Revised	Newby (2012)
	Body Image States Scale	Cash, Fleming, Alindogan, Steadman, and Whitehead (2002)
	Body Shape Questionnaire	Cooper, Taylor, Cooper, and Fairburn (1987)
	Derogatis Sexual Functioning Inventory – Body Image Subscale	Derogatis and Melisaratos (1979)
	Eating Disorder Inventory 2 – Body Dissatisfaction Subscale	Garner (1991)
	Estimating Physical Attractiveness Scale	Swami, Furnham, Georgiades, and Pang (2007)
	Multidimensional Body-Self Relations Questionnaire – Appearance Evaluation, and Body Areas Satisfaction Subscales	Cash (2000)
	Psychosocial Risk Factor Questionnaire	Netemeyer, Burton, and Lichtenstein (1995)
	Bodybuilder Image Grid	Hildebrandt, Langenbucher, and Schlundt (2004)
	Body Image Measure	Collins (1991)
Global satisfaction – figural rating scales	Body Size Drawings	Stunkard, Sorensen, and Schulsinger (1980)
	Contour Drawing Scale	Thompson and Gray (1995)
	Figure Rating Scale	Fallon and Rozin (1985)
	Somatomorphic Matrix	Pope et al. (2000)
Affective measures	Objectified Body Consciousness Scale	McKinley and Hyde (1996)
	Physical Appearance State and Trait Anxiety Scale	Reed, Thompson, Bannick, and Sacco (1991)
	Social Physique Anxiety Scale	Martin, Rejeski, Leary, McAuley, and Bane (1997)
Cognitive measures	Sociocultural Attitudes Towards Appearances Questionnaire	Heinberg, Thompson, and Stormer (1995)
	Sociocultural Attitudes Towards Appearances Questionnaire – 3	Thompson, van den Berg, Roehrig, Guarda, and Heinberg (2004)
	Sociocultural Attitudes Towards Appearances Questionnaire – 4	Schaefer et al. (2015)
Male body image disturbance	Drive for Leanness	Smolak and Murnen (2008)
	Drive for Muscularity Attitudes Questionnaire	Morrison, Morrison, Hopkins, and Rowan (2004)
	Drive for Muscularity	McCreary and Sasse (2000)
	Drive for Muscularity	Yelland and Tiggemann (2003)
	Male Body Attitudes Scale	Tylka, Bergeron, and Schwartz (2005)
	Male Body Attitudes Scale – Revised	Ryan, Morrison, Roddy, and McCutcheon (2011)
	Male Eating Behavior and Body Image Evaluation Scale	Kaminski et al. (2005)

the degree of heterogeneity by using the I^2 percentage. I^2 percentages are interpreted as the proportion of variability in effect sizes due to true differences between studies as opposed to sampling error (Higgins & Thompson, 2002). Percentages of 25 %, 50 %, and 70 % indicate low, medium, and high heterogeneity respectively (Higgins & Thompson, 2002). Comparisons with a statistically significant Q-statistic and large I^2 percentages indicated heterogeneity between effect sizes that may be explained by moderating study characteristics (Borenstein et al., 2009). Due to low power of other hypothesised variables, the only moderator that we were able to analyse was study quality. To test for moderation, we conducted mixed-effects meta-regressions on the comparisons with high heterogeneity, and we coded study quality as a dummy variable as it is a categorical variable. We used the low-quality studies as the reference group.

2.3.2. Quality assessment

We assessed the quality of each study using the critical Appraisal Tool for Cross-Sectional Studies (AXIS tool) to assess the quality of cross-sectional studies (Downes, Brennan, Williams, & Dean, 2016). A limitation of the original AXIS tool is that there was no numerical scale designed to reflect the quality. To overcome this limitation, we modified the AXIS tool by taking each point of the AXIS tool and created a scoring sheet to calculate a total score out of 20 (see Fig. 2 for the AXIS tool scoring sheet). Scores 17 and above indicated "high-quality" studies, between 13 and 16 were "medium-quality" studies, and scores 12 and under were considered a "low-quality" study. We calculated an intraclass correlation coefficient (ICC) based on the quality assessment score of each study from S.D and D.C. The ICC value was .79 (95 % CI [.63, .88], $p <$ .001), indicating acceptable reliability between the quality assessment scores of the two authors.

2.3.3. Publication bias

The Fail-safe *N* is a statistical tool that addresses publication bias. The resulting calculation estimates the number of unpublished, statistically non-significant studies needed to make a statistically significant result no longer statistically significant (Rosenthal, 1979). We used the Fail-safe *N* to determine publication bias in the studies because studies that report significant results are more likely to be published compared to non-significant results. Rosenthal (1979) suggested that if the Fail-safe *N* is at least $5k + 10$ greater than k, there can be confidence that the statistical significance of the results are accurate and would not change to statistically non-significant with the inclusion of studies with null findings.

We generated funnel plots to visually inspect heterogeneity and publication bias in the results of comparisons comprising more than 10 studies (Borenstein et al., 2009). Funnel plots visually show the heterogeneity, or differences in results, in the included studies. For a potential indicator of publication bias, a funnel plot would have an asymmetrical pattern, that is, the plots would not be uniformly scattered around the overall estimate of the meta-analysis (Sedgwick, 2013). In addition, we used the trim-and-fill method (Duval & Tweedie, 2000) to assess any funnel plot asymmetry that was not detectable upon visual inspection.

3. Results

3.1. Lesbian and heterosexual women

All three comparisons between lesbian and heterosexual women were statistically significant, indicating that heterosexual

Introduction		Yes	No	Do not know/comment
1.	Were the aims/objectives of the study clear?			
Methods				
2.	Was the study design appropriate for the stated aim(s)?			
3.	Was the sample size justified?			
4.	Was the target/reference population clearly defined? (Is it clear who the research was about?)			
5.	Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?			
6.	Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?			
7.	Were measures undertaken to address and categorise non-responders?			
8.	Were the outcome variables measured appropriate to the aims of the study?			
9.	Were the outcome variables measured correctly using instruments/measurements that had been trialled, piloted, or published previously?			
10.	Is it clear what was used to determine statistical significance and/or precision elements? (e.g., p-value, CI)			
11.	Were the methods (including statistical methods) sufficiently described to enable them to be repeated?			
Results				
12.	Were the basic data adequately described?			
13.	Does the response rate raise concerns about non-responders?			
14.	If appropriate, was information about non-responders described?			
15.	Were the results internally consistent?			
16.	Were the results for the analyses described in the methods, presented?			
Discussion				
17.	Were the authors' discussions and conclusions justified by the results?			
18.	Were the limitations of the study discussed?			
Other				
19.	Were there any funding sources or conflicts of interested that may affect the authors' interpretation of the results?			
20.	Was ethical approval and consent of the participants attained?			

Fig. 2. AXIS scoring checklist created for assessment of study quality.

Table 3
Comparisons on Body Image Between Lesbian and Heterosexual Women.

Group	Number of studies	Hedges's *g*	SE	95 % CI	*p*	Fail-safe N	Minimum Fail-safe N
Global Satisfaction	**23**	**0.13**	**0.03**	**[0.08, 0.19]**	**<.001**	**212**	**125**
Figural-Rating Scales	**8**	**0.24**	**0.04**	**[0.17, 0.32]**	**<.001**	**71**	**50**
Cognitive	5	0.21	0.05	[0.12, 0.31]	<.001	19	35

Note. Bolded text indicates the comparison met the minimum Fail-safe N.

women reported greater BID compared to lesbian women across all measure groupings. See Table 3 for effect sizes and CI. Fig. 3 displays the forest and funnel plots for the overall global satisfaction comparisons between lesbian and heterosexual women. The global satisfaction and figural-rating scales comparisons had trivial effect sizes, and the cognitive measure comparison had a small effect size. The global satisfaction comparison contained an outlier (Lakkis, Ricciardelli, & Williams, 1999), with a *g* value of 1.73. We removed this study and re-ran the analysis. The mean *g*-value changed from 0.18 to 0.13, which was still statistically significant. The global satisfaction and figural-rating scales comparisons passed Rosenthal's (1979) Fail-safe *N*.

3.1.1. Moderator analyses

The global satisfaction analysis test for heterogeneity revealed a medium level of heterogeneity among the studies (Q = 37.88, p = .019, I^2 = 41.90 %). The effect sizes for the high-quality (g = 0.12), medium-quality (g = 0.15), and low-quality (g = 0.01) were similar, with the medium- and high-quality study effect size being statistically significant (p < .001 and p = .041), and tests for moderation indicated that the study quality was not a statistically significant moderator (Q = 0.57, df = 2, p = .751). Both the figural-rating scales (Q = 8.18, p = .417, I^2 = 2.14 %) and cognitive measure (Q = 2.99, p = .559, I^2 = 0%) analyses had statistically non-significant Q-values; therefore we did not conduct moderation analyses.

3.2. Gay men and lesbian women

We conducted two comparisons between gay men and lesbian women. Both comparisons were statistically significant with small effect sizes, indicating lesbian women reported greater BID; however, only the global satisfaction comparison passed the tests for publication bias. See Table 4 for the effect sizes and CI of these comparisons. Fig. 3 displays the forest and funnel plots for the overall global satisfaction comparisons between gay men and lesbian women.

3.2.1. Moderator analyses

Both the global satisfaction (Q = 21.92, p = .188, I^2 = 22.44 %) and the figural-rating scales (Q = 6.61, p = .158, I^2 = 39.44 %) analyses had statistically non-significant Q-values; therefore, we did not conduct moderation analyses.

3.3. Gay and heterosexual men

All comparisons between gay and heterosexual men were statistically significant with a small or medium effect size, indicating that gay men reported greater BID compared to heterosexual men. The analysis for the figural-rating scales contained two outliers (Boroughs & Thompson, 2002; Gil, 2007); g values were 3.04 and 5.40 respectively. We removed these studies and re-ran the analysis. The g-value changed from 0.91 to 0.26, which was still statistically significant. Both the figural-rating scales and affect

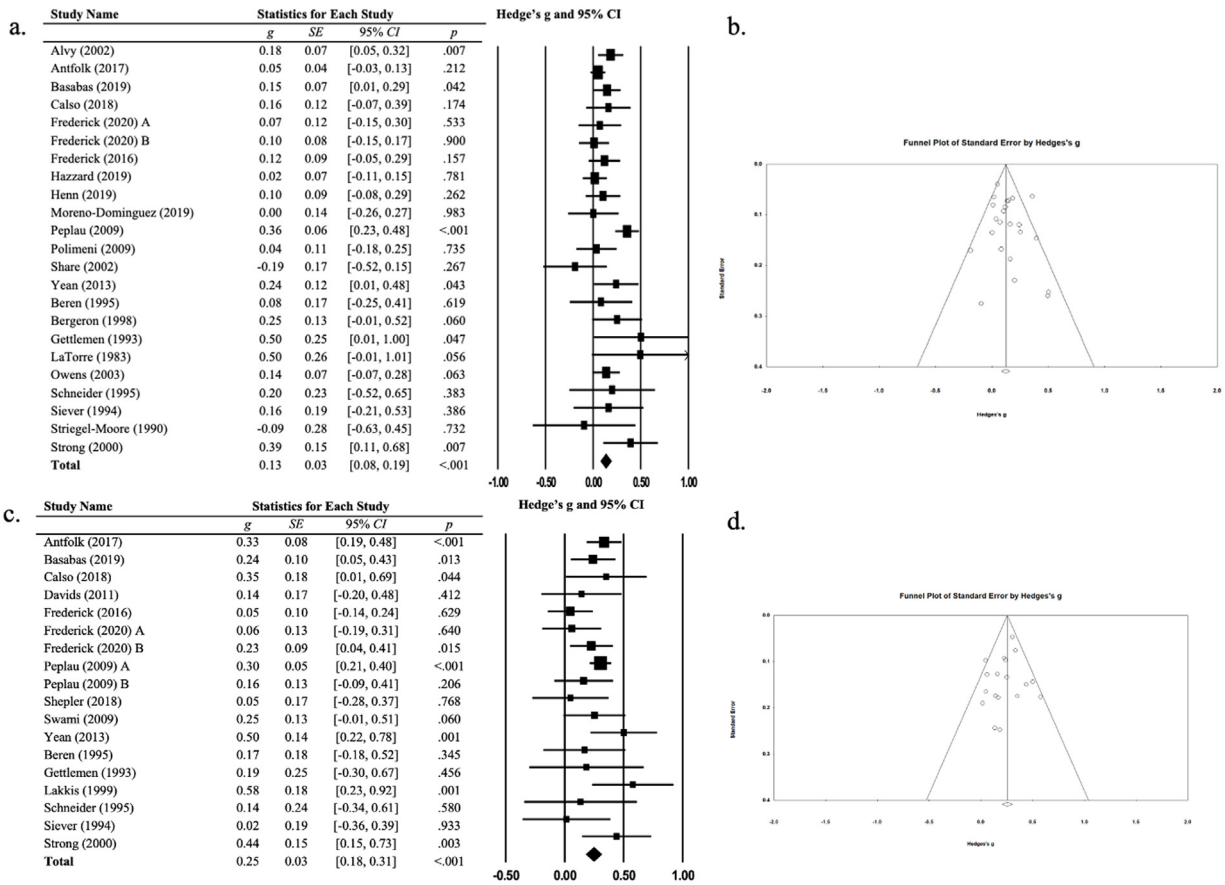

Fig. 3. a) Forest plot and b) funnel plot of the global satisfaction analysis between lesbian and heterosexual women; c) forest plot and d) funnel plot of the global satisfaction analysis between gay men and lesbian women.

Table 4
Comparisons on Body Image Between Gay men and Lesbian Women.

Group	Number of studies	Hedges's *g*	SE	95 % CI	*p*	Fail-safe N	Minimum Fail-safe N
Global Satisfaction	**18**	**0.25**	**0.03**	**[0.18, 0.31]**	**<.001**	**302**	**100**
Figural-Rating Scales	5	0.33	0.11	[0.12, 0.54]	.002	16	35

Note. Bolded text indicates the comparison met the minimum Fail-safe N.

Table 5
Comparisons on Body Image Between Gay and Heterosexual Men.

Group	Number of studies	Hedges's *g*	SE	95 % CI	*p*	Fail-safe N	Minimum Fail-safe N
Global Satisfaction	**26**	**0.32**	**0.05**	**[0.23, 0.41]**	**<.001**	**1295**	**140**
Figure Rating Scales	10	0.26	0.70	[0.13, 0.40]	<.001	56	60
Affective	4	0.49	0.14	[0.22, 0.75]	<.001	23	30
Cognitive	**6**	**0.37**	**0.08**	**[0.21, 0.52]**	**<.001**	**54**	**40**
Male Measures	**11**	**0.30**	**0.06**	**[0.20, 0.41]**	**<.001**	**100**	**65**

Note. Bolded text indicates the comparison met the minimum Fail-safe N.

measure comparisons did not meet Rosenthal's (1979) Fail-safe *N* cut off. Table 5 displays the effect sizes and CI of these comparisons. Fig. 4 displays the forest and funnel plots for the global satisfaction and male body image comparisons between gay and heterosexual men.

3.3.1. Moderator analyses

The global satisfaction analysis test for heterogeneity revealed a high level of heterogeneity among the studies (Q = 119.57, p <.001, I^2 = 79.09 %). The effect sizes for the high-quality (g = 0.38), medium-quality (g = 0.35), and low-quality studies (g = 0.28) were all statistically significant, and tests for moderation indicated that the study quality was not a statistically significant moderator (Q = 0.62, df = 2, p = .733).

4. Discussion

Results from this study pertain to the current state of the literature regarding sexual orientation and BID. Overall, the outcomes indicate that both sexual orientation and gender influence the experience of BID. Heterosexual women reported greater levels of BID compared to lesbian women on the global satisfaction, figural-rating scales, and cognitive measure comparisons. However, despite the statistically significant results, the effect sizes

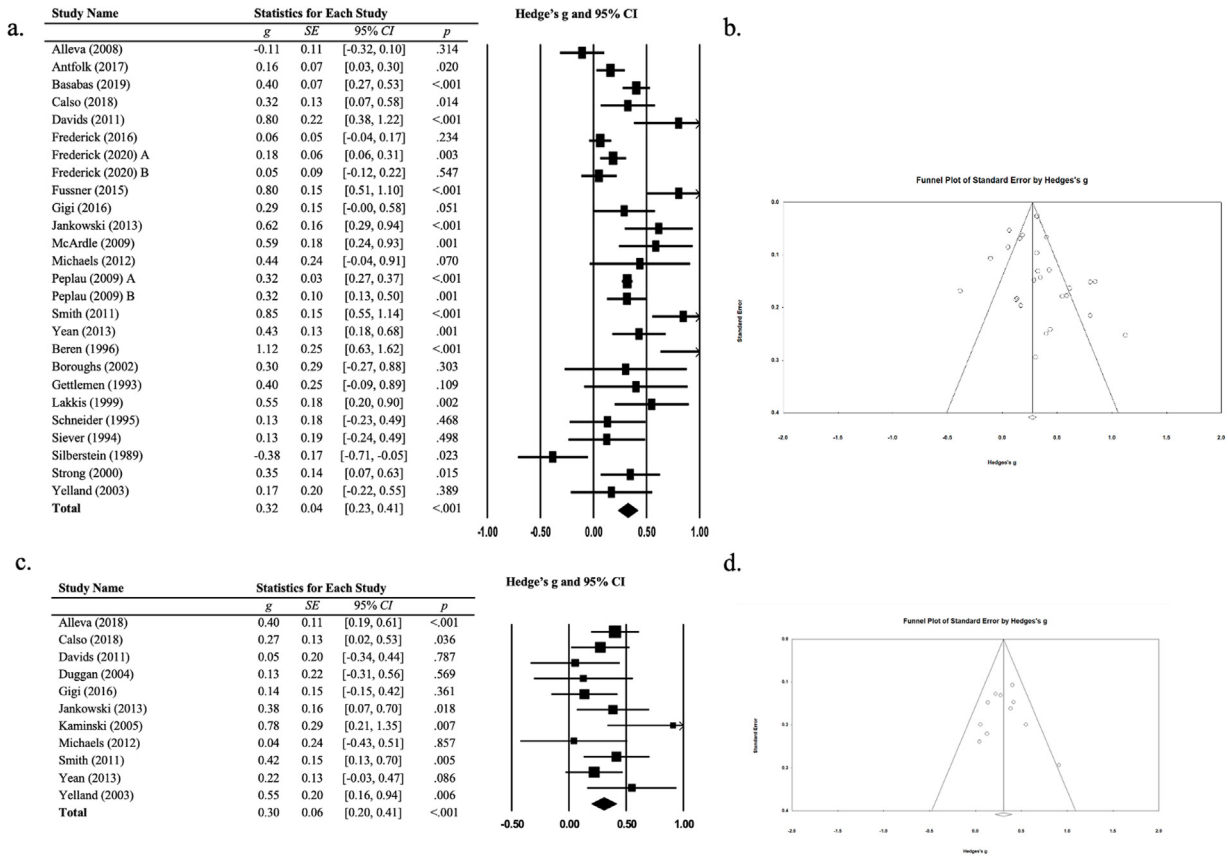

Fig. 4. All forest and funnel plots are for comparisons between heterosexual versus gay men. (a) Forest and (b) funnel plot for the global satisfaction analyses, and (c) forest and (d) funnel plot for the male measure analyses.

were trivial (for the global satisfaction and figural-rating scales comparisons) and small (cognitive measure comparison). Additionally, results indicate that publication bias is a potential threat to the robustness of the results. Only the global satisfaction comparison passed Fail-safe *N* as per Rosenthal's suggested cut off. This result, even considering the trivial effect size, indicates that the likelihood of substantial differences between heterosexual and lesbian women regarding BID was low, but nonetheless a pertinent and statistically significant difference.

These results differ slightly from the previous findings of Morrison et al. (2004), who found that lesbian and heterosexual women did not statistically significantly differ on measures of body satisfaction: our effect size was larger, and the results were statistically significant. Previous research has found that lesbian women generally have higher BMIs and a preference for larger figures, with researchers suggesting this could be why lesbian women are slightly happier with their physical selves (Alvy, 2013). Results from this meta-analysis support those suggestions. The results from all the analyses comparing lesbian and heterosexual women indicated that heterosexual women report greater BID globally, cognitively, and based on figural-rating scales. However, only the global satisfaction comparison passed tests for publication bias. The failure of the other analyses to pass publication bias tests leaves us with the possibility that there are sufficient unpublished studies in existence that have produced a statistically non-significant effect to call the significance of these results into question; that is, no statistically significant differences were found between lesbian and heterosexual women in terms of BID from a cognitive and figural-rating scale perspective. Two current theories can help to explain the seemingly contradictory results between lesbian and heterosexual women.

By examining both objectification theory (Fredrickson & Roberts, 1997) and the protective hypothesis (Brown, 1987), we suggest that it is not a matter of one theory reigning superior over the other, but a combination of both theories is required. Fredrickson and Roberts (1997) posited that women in Western cultures grow up in a society that sexualises the female body and women are therefore then faced with the task of trying to meet the unrealistic standards of attractiveness. Failure to meet these standards may result in self-objectification, then body shame, and ultimately, BID. As Dworkin (1989) argueed, lesbian women still experience the innate and subconscious pressures from society to look a certain way, still consciously or subconsciously endure self-objectification, and therefore still experience BID. However, Brown (1987) suggested that lesbian women could be considered to be less vulnerable to self-objectification (and hence BID) compared to heterosexual women, given their position in a sub-culture where women are exempt from the same pressures as heterosexual women to be attractive to men, which is where much of this pressure can arise (Grossbard, Neighbors, & Larimer, 2011). Lesbian women still experience the subconscious pressures from society to look a certain way, and therefore have the capacity to still experience BID, but because lesbian women have immersed themselves in a culture that places less emphasis and importance on the heteronormative standards, they are somewhat protected from experiencing BID to the same degree as heterosexual women. The combination of these two theories may explain the results from the comparisons between lesbian and heterosexual women.

All comparisons between gay men and lesbian women were statistically significant and indicated that lesbian women reported experiencing greater BID compared to gay men. However, only the global satisfaction analysis passed the tests for publication bias.

There is a trend for men in general to report greater body satisfaction than do women (Peplau et al., 2009). Peplau et al. (2009) found when participants with similar BMIs were compared, gay men, lesbian women, and heterosexual women scored similarly on self-rated attractiveness, but gay men reported greater comfort in a swimsuit.[2] Although research has previously reported that gay men experience greater BID compared to heterosexual men (Smith, Hawkeswood, Bodell, & Joiner, 2011), the results from our analyses along with previous research (e.g., Gentile, Grabe, Dolan-Pascoe, & Wells, 2009) suggest that effect sizes associated with gender may be larger than are those for sexual orientation. Historically, however, gay men have been found to be as affected by socio-cultural pressures as women (Yean et al., 2013) which may help to explain the failed publication bias tests of the figural-rating scale analysis. It could be that gay men may experience body size dissatisfaction similarly to both heterosexual and lesbian women, but less general BID overall than do heterosexual and lesbian women.

Gay men reported statistically significantly greater levels of BID compared to heterosexual men over all comparisons. There are different theories pertaining to why gay men experience worse BID, especially compared to heterosexual men. Smith et al. (2011) reported that gay men believe a prospective potential partner would prefer a leaner figure than they want for themselves, with the authors positing that this is in line with research suggesting that gay men culture puts high value on leanness, less body fat, and youthfulness. Additionally, Kousari-Rad and McLaren (2013) found that gay men who considered themselves moderately or highly belonging to the gay community experienced high body dissatisfaction and lower self-esteem. Comparatively, heterosexual male culture has an emphasis on more bulk and muscle (Duggan & McCreary, 2004; Peplau et al., 2009). This penchant for gay male culture to highly value leanness, low body fat, and youthfulness, in contrast to heterosexual male culture, gives deeper understanding to the results of the meta-analysis.

It is important to highlight the comparisons between gay and heterosexual men that failed tests for publication bias (the figural-rating scales and affect measures). The figural-rating scales analysis examined the differences between the current and ideal body size of an individual. Due to the reported effect of publication bias on the results of the figural-rating scales comparison, the results suggest that there may be no significant differences between gay and heterosexual men in terms of their body size dissatisfaction. Two of the four measures that composed the figural-rating scales comparison (Bodybuilder Image Grid and Somatomorphic Matrix) were designed specifically to capture details about muscular and lean body shapes, making them appropriate measures for male-specific body image. Furthermore, affect plays an important role in an individual's body image, and can include feelings of distress, anxiety, or shame associated with either specific areas of the body, or an individual's body generally (Menzel et al., 2011). The results from the affect measure comparison, particularly the subsequent failure of publication bias tests indicated that men, regardless of sexual orientation, experience potentially similar degrees of distress, anxiety, or shame associated with their body image.

The tests for assessing the study quality as a moderator indicated that for all comparisons, the quality of the study was not a statistically significant moderator of the effect sizes. For the two comparisons with a statistically significant *Q*-value, indicating heterogeneity between the studies, none of the moderation analyses indicated that the quality of a study is a statistically significant moderator. Due to a lack of power when considering other moderator variables, we were not able to conduct any further moderator analyses. Based on the results of the moderator analyses, we can be confident that most of the effect sizes found were not significantly affected by the quality of the study, but we are not confident about other moderator variables.

There are several limitations to this study. Many of the studies were from Western countries and the samples comprised White, university-aged participants. Researchers should extend the investigation of sexual orientation and body image to other cultures i.e., non-Western cultures. It would be intriguing research to determine if similar results would be found in other non-Western countries, ethnicities, and races. Another limitation relates to the data available from the studies included in the analyses. Despite there being many eligible studies to include, there were differences in how variables (e.g., age, BMI, sexual orientation) were measured and reported that meant we could not use those variables as moderators. This was particularly noticeable in the older studies included in the analyses, as multiple studies failed to report age and BMI.

To conclude, it appears that no groups, regardless of gender or sexual orientation are immune from the effects of BID. However, there may be variability associated with sexual orientation, but less than is associated with gender. Heterosexual women reported greater BID compared to lesbian women on global measures of BID, but the results are inconclusive regarding if these differences extend to body size dissatisfaction and cognitive elements of BID. Gay men have generally reported greater BID compared to heterosexual men, and this could stem from the higher pressures gay men face in their communities in terms of grooming and an emphasis on the physical self (Strubel & Petrie, 2018). Moving forward, it would be beneficial for researchers to determine the specific nuances of each group of people that can provide further explanation for these results. Uncovering exactly how BID presents to people of different genders and sexual orientations can lead to important information, and development of resources to help all people feel more positive about their bodies.

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CRediT authorship contribution statement

Sophie C. Dahlenburg: Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing - original draft, Visualization. **David H. Gleaves:** Conceptualization, Methodology, Writing - review & editing, Supervision. **Amanda D. Hutchinson:** Conceptualization, Methodology, Writing - review & editing, Supervision. **Daniel G. Coro:** Validation, Investigation, Writing - review & editing.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.bodyim.2020.08.009.

Declaration of Competing Interest

The authors report no declarations of interest.

[2] Comfort in a swimsuit was a hypothetical question; the participants were asked: "How do you think you look in a swimsuit?" Response options ranged from "Good; I'm proud/ not at all embarrassed to be seen in a swimsuit" = 3 to "So uncomfortable that I avoid wearing one in public" = 1" (Peplau et al., 2009 p. 719).

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