

Buffering anti-fat attitudes using contact: The roles of contact quantity, duration, favorability, and intergroup anxiety

Asha Ganesan ^{a,*}, Adrienne R. Carter-Sowell ^b

^a Department of Psychological & Brain Sciences, Texas A&M University, TX, USA

^b Department of Psychological & Brain Sciences and the Interdisciplinary Critical Studies Program, Texas A&M University, TX, USA



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ABSTRACT

Decades of intergroup contact research have found that contact with outgroups reduces negative attitudes. Yet, few studies have examined the association between contact and anti-fat attitudes. Furthermore, testing different facets of contact, namely contact quantity versus contact duration, provides more precise theoretical predictions for their effectiveness in this under-tested context. This study examined whether intergroup anxiety was indirectly related to and contact favorability moderated the relationship between contact and anti-fat attitudes, tested through the constructs of contact quantity (i.e., how many individuals interacted with) and contact duration (i.e., how often time was spent). Undergraduates ($N=343$; 260 women) based in the United States completed an online survey assessing intergroup contact, contact favorability, intergroup anxiety, and anti-fat attitudes. Analyses of conditional indirect effects showed that longer contact but not more contact reduced intergroup anxiety, which lowered anti-fat attitudes. The indirect paths for both contact types were not conditional upon contact favorability. Contact favorability moderated the association between contact duration and anti-fat attitudes such that longer and more favorable contact lowered anti-fat attitudes. Findings are discussed within the contact hypothesis, and future research should explore the distinct elements of the hypothesis as applicable to anti-fat prejudice in in-person and online contexts.

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1. Introduction

Body-inclusivity efforts have empowered higher weight¹ individuals and have simultaneously faced backlash from individuals who believe that focusing on higher weight bodies reinforces unhealthy lifestyles (Webb, Vinoski, Bonar, Davies, & Etzel, 2017). These notions could be countered by intergroup contact, where research has shown that increased contact between different groups, under certain conditions, reduces prejudice (Pettigrew & Tropp, 2006). However, to date, little work has examined these conditions for anti-fat attitudes, and the understanding of the antecedents and effects of anti-fat attitudes is marginal in the intergroup contact literature (Alperin, Hornsey, Hayward, Diedrichs, & Barlow, 2014). Detailed knowledge of the conditions under which contact influences anti-fat attitudes can generate novel and fine-

tune existing contact-based interventions. The present research seeks to address this gap by focusing on different types of intergroup contact as well as indirect and moderating factors that influence anti-fat attitudes.

1.1. Contact hypothesis and anti-fat attitudes

The contact hypothesis stipulates that contact between different groups, under certain conditions, can improve attitudes toward marginalized groups (Allport, 1954). The conditions for effective contact are tested widely through individuals' contact with various social outgroups (e.g., Davies, Tropp, Aron, Pettigrew, & Wright, 2011; Pettigrew & Tropp, 2006). At the same time, there are few studies looking at the conditions of the contact–prejudice association, such as contact favorability (i.e., how positive/negative the contact was) and intergroup anxiety (i.e., the anxiety felt at the prospect of interaction), in relation to attitudes toward higher weight individuals (e.g., Alperin et al., 2014; Dunaev, Brochu, & Markey, 2018; Koball & Carels, 2015; Meadows et al., 2017; Merritt et al., 2018; Phelan et al., 2015; Turner & West, 2012; Turner, Wildschut, & Sedikides, 2012). Of these studies, the results show three general trends: (1) increased contact reduces anti-fat attitudes in self-report and behavioral measures; (2) intergroup

* Corresponding author at: Texas A&M University, 4325 TAMU, College Station, TX 77840, USA.

E-mail address: aganesan@tamu.edu (A. Ganesan).

¹ There is a lack of consensus on the best term to refer to higher weight individuals (see Calogero, Tylka, Mensinger, Meadows, & Danielsdóttir, 2019; Meadows & Danielsdóttir, 2016; Puhl, 2020). We opted to use the term "higher weight" in our research reporting as it is a weight-neutral term.

anxiety indirectly influences this association in some studies, such that more contact reduces anti-fat attitudes when anxiety felt is low; (3) contact favorability is a significant predictor of anti-fat attitudes such that more favorable contact reduced anti-fat attitudes. These trends provide the basis for our research.

These conditions have also been tested in experimental research on contact types, such as face-to-face or imagined contact, with imagined contact being the predominant focus. Generally, when individuals imagined coming into contact with a higher weight individual, they showed reduced negative anti-fat attitudes compared to control groups (Dunaev et al., 2018; Merritt et al., 2018; Turner & West, 2012; Turner et al., 2012). However, in a study comparing these strategies, face-to-face contact was shown to be more effective in reducing anti-fat attitudes than imagined contact (Koball & Carels, 2015), suggesting that in addition to intergroup anxiety and contact favorability, the type of contact itself plays an important role in the contact–prejudice link.

In the contact literature, though contact is usually measured as a general construct, the measures themselves assess different types of contact, namely **contact quantity** (i.e., how many individuals from a particular group people interact with regularly) and **contact duration** (i.e., how often they spent time with individuals of a particular group). Though earlier versions of the scales use single- and multi-item scales to measure the two different types of direct contact (Turner, Hewstone, & Voci, 2007), some more recent adapted iterations combined the two constructs (e.g., Taschler & West, 2017). Although the focus of the present study does not concern the psychometric properties of contact quantity scales, there is currently little guidance on the best practices of implementing these scales, particularly outside of racial groups (see Lolliot et al., 2015 for review). Notably, previous research suggests that contact quantity and contact duration are not necessarily equivalent. For instance, in a meta-analysis, contact duration was found to be an important factor in how contact improves interactions, above and beyond having relationships (i.e., contact quantity) with members of marginalized groups (Davies et al., 2011). As such, these different facets of contact may diverge in how they influence anti-fat attitudes, with people potentially having more contact with higher weight individuals but spending less time with them. Additionally, some researchers have highlighted that majority of the prejudice reduction experimental literature focuses on second-degree and imagined contact rather than interpersonal contact (Paluck, Porat, Clark, & Green, 2021), with the former two often being shorter forms of contact. Though our research is correlational, we aim to contribute to this research line's continuing development by measuring (1) how many higher weight individuals people interact with regularly and (2) how often they spend time with higher weight individuals as two distinct types of contact.

There are some nuances to anti-fat attitudes that may further influence the conditions under which it is effectively reduced. Specifically, intergroup contact is hypothesized to reduce prejudice toward marginalized groups, who are usually minority groups. Higher weight individuals are marginalized, but not necessarily numerical minorities – a possible “marginalized majority.” For instance, previous research using national weight indicators across nations suggests that a higher national percentage of higher weight people is associated with stronger implicit anti-fat attitudes (Marini et al., 2013). Thus, a broadly defined construct of contact may not fully capture the intergroup dynamics of being marginalized and at the same time being numerically represented in society.

1.2. The present study

The present research explores the conditions for reducing anti-fat attitudes through contact by focusing on two types of contact, contact quantity and contact duration. We also tested the indirect

effect of intergroup anxiety and the moderating effect of contact favorability. These two factors are the main variables in the association between contact and prejudice, which show consistently robust findings (see Binder et al., 2009; Pettigrew & Tropp, 2008; Lolliot et al., 2015). The predictors were limited to these to ensure adequate statistical power for multiple comparisons. Based on the reviewed findings that more contact with higher weight individuals is associated with lower anti-fat attitudes, we hypothesized that:

- 1 Increased intergroup anxiety, moderated by contact favorability, will indirectly influence the association between contact quantity and anti-fat attitudes. Contact favorability will also moderate the association between contact quantity and anti-fat attitudes, such that more contact will reduce anti-fat attitudes among participants rating the contact as more favorable (vs. less favorable).
- 2 Increased intergroup anxiety, moderated by contact favorability, will indirectly influence the association between contact duration and anti-fat attitudes. Contact favorability will also moderate the association between contact duration and anti-fat attitudes, such that longer contact will reduce anti-fat attitudes among participants rating the contact as more favorable (vs. less favorable).

2. Method

2.1. Participants

A total of 353 undergraduates from a Southwestern university in the United States (U.S.) participated for partial course credit. Ten participants were excluded due to incomplete responses. Final analyses consisted of 343 participants (260 women, 82 men, 1 unreported; $M_{age} = 19.13$ years, $SD = 1.02$). Most participants identified as White/European (215) or Hispanic/Latinx-American (73), with remainder identifying as Southeast-Asian (15), Northeast-Asian (16), South-Asian (9), Multiracial (9), Middle-Eastern/North-African (4), Native-American/American-Indian/Alaska Native (1), unreported (1). The majority were born in the U.S. (314). A Monte Carlo power analysis for conditional indirect effects showed that the current sample had at least 95 % power to detect the hypothesized effect, Cohen's $d = 0.46$ or $r = .23$ (see effect size determination details in Supplemental Information; SI).

2.2. Measures

We note that though we use the term “higher weight individuals” in the main sections of this paper, in line suggestions by weight stigma researchers to use neutral terms in research reporting (see Meadows & Daníelsdóttir, 2016), the measures used the term “overweight or obese individuals” in line with previous studies, to minimize ambiguity about the target group of interest.

2.2.1. Contact quantity

Participants rated how many higher weight individuals they interact with on a typical day (adapted from Taschler & West, 2017; Turner et al., 2007): (1) “your close friends,” (2) “the people in your close family,” (3) “the people you have dated or been intimate with” and (4) the people you see on a typical day.” The items were rated on a 5-point Likert scale (1=None, 2=A few, 3=About half, 4=Most, 5=Almost all). Higher scores indicated more contact with higher weight individuals. Notably, the measure showed below acceptable reliability ($\alpha = .62$), potentially attributable to item-level differences (see SI for further discussion).

2.2.2. Contact duration

Participants rated four items on how often they spent time with higher weight individuals who were (1) friends, (2) co-workers or

Table 1

Means, Standard Deviations, Correlations, and Internal Reliability Estimates for Study Variables.

Variables	n	α	M (SD)	1	2	3	4	5
1. Anti-fat attitudes - Dislike	343	.88	1.43 (1.44)	—				
2. Contact favorability	343	.93	5.27 (1.21)	-.40***	—			
3. Contact quantity	343	.62	1.84 (0.49)	-.18**	.18***	—		
4. Contact duration	343	.75	2.27 (0.81)	-.38***	.32***	.66***	—	
5. Intergroup anxiety	343	.78	2.79 (1.09)	.46***	-.45***	-.03	-.18**	—

Note. For significance levels, * $p < .050$; ** $p < .010$, *** $p < .001$. M = Mean; SD = Standard deviation.

fellow students, (3) family, and (4) their dates or intimate partners (adapted from Taschler & West, 2017; Turner et al., 2007). The items were rated on a 5-point Likert scale (1=None, 2=Occasionally, 3=Sometimes, 4=Quite a lot, 5=Almost all). Higher scores indicated more contact with higher weight individuals ($\alpha = .75$).

2.2.3. Contact favorability

Participants rated on a 7-point semantic differential scale (-3=not at all, +3=very) how unpleasant-pleasant, unfriendly-friendly, negative-positive, unenjoyable-enjoyable, difficult-easy, competitive-cooperative, distant-intimate, and superficial-natural, their contact with higher weight individuals had been (West & Hewstone, 2012). Higher scores indicated more favorable contact with higher weight individuals ($\alpha = .93$).

2.2.4. Intergroup anxiety

Participants responded on a 7-point Likert scale (1=Not at all, 7=Very) on how awkward, happy (reversed), self-conscious, competent (reversed), relaxed (reversed), shocked, and disgusted they would feel if they were to meet a higher weight person in the future (Stephan & Stephan, 1985). Higher scores indicated more anxiety at the prospect of meeting a higher weight person ($\alpha = .78$).

2.2.5. Anti-fat attitudes

Participants rated 13 items assessing their attitudes toward higher weight individuals (Crandall, 1994) on a 10-point Likert scale: 0=Very strongly disagree, 9=Very strongly agree. The scale consists of three subscales, Dislike, Fear of Fat, and Willpower, but we only analyzed responses to the seven-item Dislike sub-scale, which is the direct measure of anti-fat attitudes. The subscale ($\alpha = .88$) consisted of items such as "I really don't like fat people much." A higher score indicated higher anti-fat attitudes.

2.2.6. Additional measures

Participants reported their gender, age, country of birth, ethnicity, and height and weight. Participants also pilot tested one of two measures for future research, which were not analyzed in the present study (see SI for details).

2.3. Procedures

Participants provided informed consent and completed all measures online via Qualtrics, where the order of all measures was randomized. Then, they reported demographics and were fully debriefed. Notably, all data were collected before the university transitioned to online classes due to the COVID-19 pandemic.

3. Results

3.1. Data management and preliminary analysis

To determine whether the indirect effects of intergroup anxiety between contact and prejudice (for the two contact types) and the contact–prejudice association were moderated by contact favorability, conditional process models were tested. All models were run

using the PROCESS macro (Model 8; Hayes, 2017), with statistical significance of indirect effects tested through bootstrap procedures using 5000 bootstrap samples. Any significant interactions were probed using the Johnson-Neyman technique (Johnson & Neyman, 1936). Statistical significance of the associations was determined by 95 % bias-corrected confidence intervals (CI) not including zero. All predictor and antecedent variables were mean-centered. The analyses and tests for outliers, normality of residuals, homoscedasticity, and multicollinearity were estimated in SPSS 26.0 (see Table 1 for descriptives, correlations, and reliability estimates). Assumptions testing showed all were within recommended limits (Cohen, 2008).

3.2. Contact quantity

The conditional process model was shown to account for a significant proportion of variance in anti-fat attitudes, $R^2 = .28$, $F(4, 338) = 32.16$, $p < .001$ (see Fig. 1a). Intergroup anxiety did not show significant indirect effects on the association between contact quantity and anti-fat attitudes ($\beta = -.04$, $SE = .07$, 95 % CI = -.18, .10). Furthermore, contact favorability did not moderate both the hypothesized paths, but was significantly associated with anti-fat attitudes ($\beta = -.26$, $SE = .06$, $p < .001$, 95 % CI = -.38, -.14). Thus, the relationship between contact quantity and anti-fat attitudes, indirectly affected by intergroup anxiety and moderated by contact favorability, was shown minimal support.²

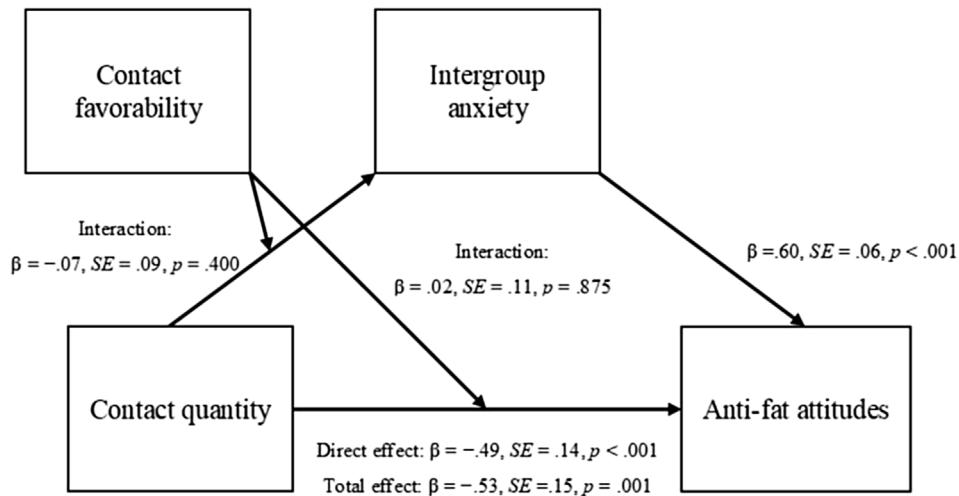
3.3. Contact duration

The conditional process model was shown to account for a significant proportion of variance in anti-fat attitudes, $R^2 = .33$, $F(4, 338) = 41.13$, $p < .001$ (see Fig. 1b). Intergroup anxiety did not show the significant indirect effects on the association between contact quantity and anti-fat attitudes ($\beta = -.13$, $SE = .05$, 95 % CI = -.23, -.05). However, contact favorability did not moderate the indirect path but significantly moderated the association of contact duration and anti-fat attitudes. Johnson-Neyman analysis showed that the negative association between contact duration and anti-fat attitudes was strongest at lower favorability levels and only weakened at the highest favorability levels. This relationship was still statistically significant at the highest favorability levels (see Fig. S1).

Thus, the relationship between contact duration and anti-fat attitudes, indirectly affected by intergroup anxiety, was not moderated by contact favorability. However, reduced contact was significantly associated with higher anti-fat attitudes among partic-

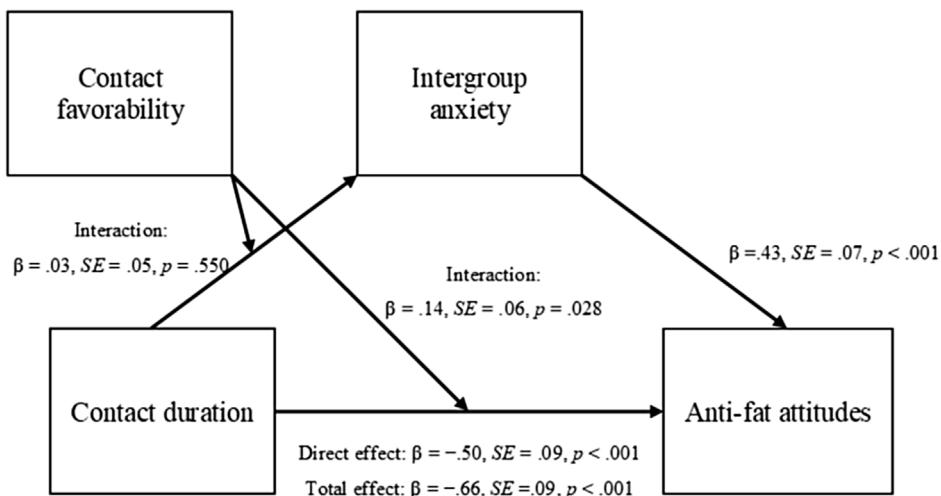
² As the contact quantity measure showed low reliability, we conducted two additional analyses. First, we re-estimated internal reliability using both omega ($\omega = .61$) and glb ($glb = .63$) coefficients, which recent research suggests are better options than Cronbach's alpha as they are better able to account for potential heterogeneity in the data (Trizano-Hermosilla & Alvarado, 2016). Both these estimates showed similar reliability levels. Second, additional conditional process models were tested with the individual items of contact quantity as predictors, given that each item constitutes different groups of individuals. For all four items, the indices for conditional indirect effects remained non-significant, in line with the findings of the overall contact quantity scale.

(a) Contact Quantity Model



Note. Index of moderated mediation: 95% CI = [−.12, .06]; Conditional indirect effects: Low contact favorability: 95% CI = [−.05, .27]; High contact favorability: 95% CI = [−.11, .17].

(b) Contact Duration Model



Note. Index of moderated mediation: 95% CI = [−.03, .07]; Conditional indirect effects: Low contact favorability: 95% CI = [−.15, .05]; High contact favorability: 95% CI = [−.09, .07].

Fig. 1. Conditional Process Models testing the Effects of (a) Contact Quantity and (b) Contact Duration on Anti-fat Attitudes.

ipants who characterized their contact as less favorable (compared to more favorable). Even when the contact was rated as highly favorable, shorter contact was associated with higher anti-fat attitudes than those who reported longer contact.

4. Discussion

The present study found that the conditions under which people have contact with higher weight individuals matter in their reported anti-fat attitudes, in line with previous studies (e.g., [Meadows et al., 2017](#)). Higher contact quantity led to lower anti-fat attitudes, but this association was significantly indirectly influenced by intergroup anxiety or moderated by contact favorability.

Though contrary to our predictions, the fundamental association between contact and anti-fat attitudes is in line with previous work suggesting that just a higher quantity of contact can decrease prejudice (though their long-term effects may be limited; [Paluck et al., 2021](#)). In contrast, longer contact reduced intergroup anxiety, which in turn led to lower anti-fat attitudes. Favorability of the contact did not moderate this indirect path. However, contact favorability moderated the association between contact duration and anti-fat attitudes such that longer and more favorable contact lowered anti-fat attitudes.

There are some notable patterns regarding the types of contact based on the findings. Contact duration showed expected associations with intergroup anxiety and anti-fat attitudes. This

finding is in line with empirical and meta-analytic findings showing that the contact-prejudice link is indirectly affected by intergroup anxiety (Koball & Carels, 2015). Contact duration was also moderated by contact favorability in its association with anti-fat attitudes, complementing previous studies on anti-fat attitudes (Alperin et al., 2014; Meadows et al., 2017) and the broader contact literature (e.g., Davies et al., 2011). Contact quantity had a less consistent association with anti-fat attitudes, such that it was not indirectly affected by intergroup anxiety. There is some recent evidence suggesting that the effects of contact on prejudice, overall, is weaker than previously known, and due to publication bias, there is limited understanding of when and what types of contact do and do not work (Paluck et al., 2021). Though more quantity of contact predicted lower anti-fat attitudes, the lack of indirect and conditional indirect effects suggests other influencing variables.

In terms of contact duration, there is some precedence for its influence on prejudice. Previous research suggests that the contact interventions are often “light-touch,” such that they are brief (Paluck et al., 2021, p.17). As such, longer or enduring contact may facilitate prejudice reduction better than more light-touch contact. These considerations for light-touch interventions also go hand-in-hand with those for media campaigns featuring diverse bodies. Research has shown these media campaigns positively affect self-views but do not reduce weight bias (e.g., Selensky & Carels, 2020). It is possible that these campaigns are essentially adopting a type of “light-touch” intervention, one that alludes to acceptance of higher weight bodies but does not spend much time explicitly countering fatphobia. Thus, enduring contact may be particularly relevant in countering long-standing anti-fat messaging.

This study adds to the body of work on how contact with marginalized groups, under certain conditions, facilitates the reduction of negative attitudes toward those groups. Some other potential conditions or influencing factors are worth considering, identified in other research lines. These include the role of peers (Miller, Rothblum, Brand, & Felicio, 1995), media consumption (Pearl, Dovidio, & Puhl, 2015), and online interactions (Webb et al., 2017) that impact anti-fat attitudes. For instance, research drawn from social media have documented the growth of online content that focuses on “thinspiration” (i.e., thin-ideal images) and “fitspiration” (i.e., fitness-ideal images), and both types have been shown to endorse weight-stigmatizing messages (e.g., Boepple & Thompson, 2016). In contrast, the “fatspiration” movement has made inroads in not just countering fatphobic messages but also affirming higher weight individuals and creating a sense of community (Webb et al., 2017). It is possible that individuals who have longer contact but not necessarily more contact with individuals from the fatsphere may show reduced anti-fat attitudes. Less optimistically, pre-existing norms and higher identification with their thinspiration or fitspiration ingroup may further exacerbate anti-fat messaging, even with more contact with higher weight individuals, an effect that has been demonstrated in the contact–racial prejudice literature (e.g., Turner, Hewstone, Voci, & Vonofakou, 2008). These dynamics are worth disentangling, and interventions to counter weight-stigmatizing messages online could be designed to consider the group-level dynamics of these spaces.

4.1. Limitations and future directions

This study's findings concerning intergroup contact and anti-fat attitudes provide important directions forward, but generalizations should consider the following limitations. Most importantly, contact quantity showed low measurement reliability, potentially attributable to item-level differences where participants, overall, were more likely to have family members or see everyday peo-

ple who were higher weight than having higher weight friends or dates. This issue is a part of a larger one in the measures commonly used in the intergroup contact literature – that there is a lack of standardized psychometric-evaluation of these measures to reflect recent research advances. For instance, the intergroup contact measures did not stipulate a specific timeframe in which participants should report their contact with higher weight individuals, which may have led them to forecast the amount of contact rather than recall it. Furthermore, it is unclear if intergroup anxiety is anxious feelings or intergroup emotions and how exactly this construct can be utilized in interventions needs further study (see Phelan et al., 2015). Given other research suggesting that perceptions of higher weight individuals may vary based on race and/or gender (Alt, Lick, Hunger, & Johnson, 2019), the suitability of these measures should be fully-explored and refined in future research for their utility in anti-fat prejudice research.

The present findings highlight the importance of fine-tuning contact-based predictions by considering the importance of contact duration, possibly more so than contact quantity, in mitigating anti-fat attitudes. However, the study is also limited by its cross-sectional study design, making it difficult to conclude causality between variables. Foremost, more longitudinal research is needed, including those that consider alternative indirect or moderating effects. Furthermore, informant reports, where participants consist of both higher weight individuals and those close to them (e.g., Miller et al., 1995), can provide deep-dives into higher weight individuals' lives through their own and their close others' perspectives. Using informant reports might also provide ways to understand how these close others' weight self-stigmatizing influences their interpersonal contact with higher weight individuals. Additionally, experimental research on contact and anti-fat prejudice (and prejudice in general) has primarily focused on brief interventions (see Paluck et al., 2021). Further experimental research should consider variants of the contact types studied here (i.e., contact quantity and contact duration), particularly those relevant to online-based contact. For example, online contact with higher weight individuals via social media may be brief but repeated over time or be entirely online. Conventional intergroup contact measures primarily focus on face-to-face interactions and are not readily adaptable to online interactions (see Lolliot et al., 2015). There is research using computer-mediated contact, which could help in studying social media-based contact (e.g., Maunder, White, & Verrelli, 2019). With the weight stigma literature increasingly showing the central role of social media and online interactions in exacerbating and mitigating anti-fat attitudes, validation of these measures for online contact is a crucial next step.

Lastly, future research could explore the unique aspects of anti-fat attitudes, particularly given research showing that higher weight individuals' increased numerical representation has not reduced anti-fat attitudes (see Marini et al., 2013). This line deviates from the main predictions of the contact hypothesis, which mainly focuses on contact between majority versus minority groups. In specific contexts, it possible that the increased representation of higher weight individuals further perpetuates the idea of being higher weight as problematic. For instance, during the COVID-19 pandemic, excess weight was highlighted as a risk factor for infection, leading to increased fatphobic media messaging (see Harrison, 2020). This framing may increase fear of becoming higher weight and weight self-stigmatizing (Cooper et al., 2020), manifesting in some as fat-shaming toward those with higher body weight. As such, both population dynamics and contextual factors may heighten or lessen the negativity surrounding being higher weight in contact situations. Additionally, this uniqueness of higher weight individuals as a potentially “marginalized majority” group may not be so unique in the future given demographic projections indicating that ethnic minorities in the U.S. and the U.K. will see

their numerical representation increase (Lomax, Norman, Rees, & Wohland, 2019; Vespa, Medina, & Armstrong, 2020). Thus, further understanding the role of contact in anti-fat attitudes among an already marginalized majority group has much potential to shape the future of the contact hypothesis.

4.2. Conclusion

In sum, the current study shows that the type of intergroup contact is a relevant factor in applying the contact hypothesis to anti-fat attitudes. There is still a need to explore contact-related nuances and modify measures to consider higher weight individuals' intersectional identities. Real-world interventions would be enhanced by understanding whether the conditions for prejudice reduction vary in shared spaces that highlight or amplify body size differences that cut across different groups (e.g., gyms, public transport, flights; see Schvey et al., 2017). Furthermore, the current contact-based weight bias literature is limited to predominantly-White populations, leaving many research questions open for testing. Future research would benefit from understanding how contact with higher weight individuals in different cultural spaces or contexts influence anti-fat attitudes.

CRediT authorship contribution statement

Asha Ganesan: Conceptualization, Methodology, Formal analysis, Writing - original draft, Writing - review & editing. **Adrienne R. Carter-Sowell:** Writing - review & editing, Funding acquisition.

Declaration of Competing Interest

The authors report no declarations of interest.

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All study data and adapted measures are available upon request.

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.2021.03.019>.

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