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An Experimental Examination of Peers' Influence on Adolescent Girls' Intent to Engage in Maladaptive Weight-Related Behaviors

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Abstract

Objective—Social psychological theories provide bases for understanding how social comparison processes may impact peer influence. This study examined two peer characteristics that may impact peer influence on adolescent girls' weight-related behavior intentions: body size and popularity.

Method—A school-based sample of 66 9th grade girls (12–15 years old) completed an experimental paradigm in which they believed they were interacting with other students (i.e., “e-confederates”). The body size and popularity of the e-confederates were experimentally manipulated. Participants were randomly assigned to one of the three experimental conditions in which they were exposed to identical maladaptive weight-related behavior norms communicated by ostensible female peers who were either: (1) Thin and Popular; (2) Thin and Average Popularity; or (3) Heavy and Average Popularity. Participants' intent to engage in weight-related behaviors was measured pre-experiment and during public and private segments of the experiment.

Results—A significant effect of condition on public conformity was observed. Participants exposed to peers' maladaptive weight-related behavior norms in the Heavy and Average condition reported significantly less intent to engage in weight-related behaviors than participants in either of the thin-peer conditions ($F(2) = 3.93, p = .025$). Peer influence on private acceptance of weight-related behavior intentions was similar across conditions ($F(2) = .47, p = .63$).

Discussion—Body size comparison may be the most salient component of peer influence processes on weight-related behaviors. Peer influence on weight-related behavior intention also appears to impact private beliefs. Considering peer norms in preventive interventions combined with dissonance-based approaches may be useful.

Keywords

dieting; adolescence; peer influence; social comparison

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Introduction

Adolescents' engagement in maladaptive weight-control behaviors confers risk for eating disorders, weight gain, and obesity.¹⁻³ Peers are important to adolescent girls' engagement in maladaptive weight-related behaviors. Both perceptions of peers' weight-related behaviors and peers' actual weight-related behaviors are associated with girls' own unhealthy weight-related behaviors.⁴⁻⁷ Weight-related behaviors, however, encompass a spectrum from adaptive (e.g., making healthy food choices) to maladaptive (e.g., unhealthy dieting) behavior. Although peer influence on girls' maladaptive weight-related behaviors is established, less is known about which peers may be most influential.

Social psychology offers two related theories that may be particularly relevant to understanding how peers might influence adolescent girls' weight-related behaviors. First, social comparison theory suggests that individuals evaluate themselves through comparisons with others, and then act to reduce perceived discrepancies.⁸ The association between adolescents' "self" versus "other" body comparisons and concurrent disordered eating behavior and attitudes has been examined via survey studies⁹ and experimental methods.¹⁰ Studies consistently demonstrate that adolescents' body comparisons are strongly associated with unhealthy weight-related attitudes and behaviors.¹⁰

Second, the prototype/willingness model suggests that the process of social comparison may be especially potent when individuals evaluate themselves against an "ideal," or a "high status" prototype.¹¹ Specifically, the more favorable the image of the comparison peer (i.e., the "prototype"), the more likely adolescents will be to engage in behaviors associated with that image if given the opportunity.¹¹ During adolescence, ideal prototypes often are same-aged, high status (i.e., popular) peers.¹² Many adolescent risk behaviors are strongly associated with adolescents' desire to maintain or increase their popularity among peers.^{13,14} The prototype/willingness model has yet to be applied to adolescents' unhealthy weight-related behaviors.

Although popularity may be the central prototype characteristic associated with adolescents' conformity to risk behaviors such as alcohol or tobacco use, both popularity and body size may be relevant to weight-related behavior prototypes. Data suggest that popularity is associated with thinness and also may be associated with higher levels of unhealthy weight-related behaviors among adolescent girls.^{15,16} Smaller body size, however, also is associated with higher levels of maladaptive weight-related behaviors.^{15,16} Given that thinness may be rewarded within the peer context via increased popularity, female prototypes are likely to be both thin *and* popular. It is unclear whether the most important prototype characteristic for peer influence on adolescent girls' unhealthy weight-related behaviors is the popularity of a comparison peer, the thinness of that peer, or if the impact of body-related social comparisons on maladaptive weight-related behaviors may be augmented when the comparison target/prototype is both popular and thin.

Clarifying the prototype that may be most salient to adolescent girls' intention to engage in both healthy and unhealthy weight-related behaviors has important implications for prevention work. More recent preventive interventions are emphasizing the importance of

peers in the process of preventing disordered eating behavior,¹⁷ in addition to increasing dissonance related to the societal thinness norm.¹⁸ Identifying prototypes that are influential to adolescent girls' weight-related behaviors will allow further tailoring of these prevention approaches, not only to address individual risk factors, but also to attend to broader interpersonal and contextual risk factors. Furthermore, if peer influence from ideal prototypes impacts girls' private acceptance of unhealthy weight-related behaviors, the focus of prevention messages and skills will be different than if peer influence effects are not internalized.

This study used an innovative experimental "chatroom" paradigm to examine two peer characteristics that may impact female adolescents' social comparison and peer influence processes: popularity and body size. The popularity and body size of female electronic confederates ("e-confederates") were manipulated within the experiment, but all e-confederates endorsed identical levels of intention to engage in maladaptive weight-related behaviors. It was hypothesized that adolescent girls exposed to maladaptive body and dieting norms communicated by thin and popular e-confederates would be more likely to publically conform to these behaviors than girls exposed to maladaptive norms conveyed by e-confederates who were either (1) thin and average popularity, or (2) heavy and average popularity. Although including a heavy and high popularity condition would be ideal from both methodological and interpretive perspectives, the data collected supported previous research demonstrating an association between higher popularity and lower body size.^{15,16} No participants who were popular met criteria for overweight or obese status (i.e., body mass index percentile \geq 85th percentile²⁹); therefore, it was impossible to convincingly construct a heavy and high popularity condition in the current study. It also was hypothesized that peer influence on unhealthy weight-related behavior intentions would impact private acceptance of adolescents' intentions reported outside the peer context (i.e., outside the chatroom). Specifically, participants exposed to thin and popular e-confederates would demonstrate the greatest consistency between public versus private weight-related behavior intentions.

Method

Participants

Participants included 66 adolescent girls in the 9th grade attending a rural high school in the Southeastern United States. The ethnic composition of the sample included 57.6% White, 12.1% African American, 16.7% Hispanic, 7.6% of participants from mixed ethnic backgrounds, and 6.0% Asian American. Participants were aged 12 (1.5%), 14 (83.3%), and 15 (15.2%). According to county records, the school was located in a city with a population in the middle-income socioeconomic status bracket (per capita income approximately \$47,063) and approximately 20% of students were eligible for free or reduced-price lunch. The estimated median income of the study sample was comparable to the city per capita income (\$47,657). Compared to the racial/ethnic composition of the overall school, the study sample had significantly fewer White participants ($\chi^2(1) = 4.59, p = .03$), and significantly more participants of multi-racial ($\chi^2(1) = 16.25, p < .001$) and Asian heritage ($\chi^2(1) = 9.14, p = .003$).

Procedure

All regular education 9th grade students were recruited for participation in a study examining peer relationships and psychological adjustment in the fall of 2010. Parental consent forms for study recruitment were hand-distributed to all 9th graders, with encouragement and incentives for form return. Of the 150 female 9th graders, 103 returned consent forms (69%), with 85 forms granting parental consent to participate (57% of all 9th grade girls; 83% of those who returned forms). Adolescents provided assent to participate in both the baseline questionnaire and experimental portions of the study at baseline. Seventy-six girls (89% of consented sample) provided baseline data; attrition was because of transferring schools ($n = 1$) and nonattendance ($n = 8$). The study and all procedures were approved by the university human subjects committee.

Pre-experiment data collection involved a sample of 76 adolescent girls. From this original sample, a total of 72 girls provided pre-experiment data and were available for participation in the experimental portion of the study. Stratified randomization was used to ensure that participants assigned to each condition represented a range of popularity, ethnicities (categorized as White or non-White), and body sizes. Participants were assigned to one of three experimental conditions in which they were exposed to identical messages conveyed by: (1) thin and popular e-confederates (Thin & Popular); (2) thin and average popularity e-confederates (Thin & Average); or (3) heavy and average popularity e-confederates (Heavy & Average).

Sixty-eight participants completed the experimental portion of the study. Attrition was because of absence ($n = 3$) and school dropout ($n = 1$). Two participants' data were discarded because of self-reported suspicion about the study design, leaving a final sample of 66 participants for data analysis. There were no significant differences between participants who completed the experimental paradigm and those who did not in terms of ethnic/racial identification, body mass index, perception of current figure (i.e., silhouette selection), and responses to weight-related behavior scenarios. A priori power analyses suggested that this sample size would be sufficient to detect large between-group effects of $f = .39$.¹⁹

Experimental Paradigm Construction

Pre-experiment measures of popularity, likeability, body mass index, body silhouettes, and weight-related behavior intentions were collected before adolescents participated in the experimental paradigm. Data from this pre-test were used: (1) to construct the experimental paradigm; (2) for participant randomization into different experimental conditions; and (3) as a covariate in analyses of experimental results.

Sociometric Assessment—Data on adolescents' peer status and friendship affiliations were used to construct the experimental conditions in the "chatroom." Sociometric nomination is an ecologically valid assessment method used to capture measures of students' peer status (e.g., likeability, popularity²⁰). Thus, consistent with standard procedures used in research on adolescent peer relations,²⁰ sociometric assessment was used to collect data concerning adolescents' (1) popularity and likeability among their peers and

(2) friendship affiliations. Participants nominated an unlimited number of peers from alphabetized rosters of all students in participants' grade level who were "most popular" and "least popular." The order of alphabetized names on this roster was counterbalanced (i.e., A–Z; Z–A) to control for possible order effects on nominee selection. A sum of the number of nominations each adolescent received was computed and standardized. A difference score between standardized "most popular" and "least popular" nominations was computed and re-standardized to obtain a measure of popularity (i.e., reputation-based status), with higher scores indicating greater popularity.²¹ Adolescents similarly nominated peers whom they "liked the most" and "liked the least." Likeability (i.e., preference-based status) scores were calculated in the same manner as popularity scores, with higher scores indicating being more well-liked by peers and lower scores indicating greater peer rejection.²² Although the focus of this study was on the reputation-based construct of popularity, popularity and likeability are distinct peer status constructs by adolescence²³ and are differentially associated with health risk behaviors²⁴; therefore, likeability scores also were considered in the construction of the experimental conditions. Of note, research has documented a lack of negative outcomes associated with children's and adolescents' completion of sociometric assessments.²⁵

Participants also selected an unlimited number of their "closest friends" from a grade-wide roster and then, from this selection, specified a "very best friend" and two additional "best friends." Sociometric data were used to construct experimental conditions (i.e., to determine friendship groups of high popularity and average popularity peers).

Hypothetical Weight-Related Scenarios—Because it would be unethical to induce disordered eating behavior in participants, participants' intention to engage in weight-related behaviors (either adaptive or maladaptive) was measured as a proxy for actual weight-related behaviors. Behavioral intention is significantly correlated with, and predictive of, engaging in risk behaviors, including unhealthy weight-related behaviors.^{26,27}

Adolescent girls' weight-related behavior intentions were assessed using a hypothetical scenario instrument. Participants were presented with hypothetical situations in which adolescent girls may feel pressure to engage in unhealthy weight-related behaviors. Two focus groups of recent high school graduates contributed to the creation and revision of this instrument. Focus group participants provided examples of plausible, age-appropriate social situations that may encourage disordered eating behavior, particularly in a peer context, as well as a range of possible responses to these situations (i.e., adaptive to maladaptive). Once scenarios were created, feedback was elicited from focus group participants on both the scenarios and response options to achieve maximum authenticity and believability.

A total of six hypothetical weight-related behavior scenarios were constructed. Each scenario consisted of several sentences describing a situation in which adolescent girls may feel pressured to endorse maladaptive weight-related behaviors, as well as five to six behavioral responses. Scenarios represented a range of weight-related behaviors including caloric restriction, exercise, and public endorsement of body dissatisfaction. Response options ranged from adaptive (e.g., "Decide not to diet") to maladaptive (e.g., "Choose the diet you think will make you lose weight the fastest") and were ordered in a Likert-scale

format to reflect either increasing or decreasing level of risk behavior (counterbalanced across scenarios). Participants were asked to indicate the option that best represented how they would respond in the hypothetical situation; responses represented intent to engage in weight-related behaviors. For example, participants were presented with the following vignette: “You notice that one of your friends is only eating a handful of baby carrots and a few sticks of celery at lunch. Your friend says she’s trying to “get healthy” by eating “better” and losing some weight. You look down at your sandwich, fruit salad, and brownie and...” Response options included: (A) “Eat everything—sandwich, fruit, and brownie”; (B) “Eat the whole sandwich and the fruit only”; (C) “Eat half the sandwich and the fruit only”; (D) “Eat only a few bites of your lunch”; and (E) “Decide not to eat anything and throw out your lunch.”

Individual item responses were reverse-coded where appropriate and then standardized. Standardized scores were averaged into an overall composite score, with higher scores indicating greater intent to engage in mal-adaptive weight-related behavior. Internal consistency of weight-related behavior intent was acceptable at all administrations (pre-experiment $\alpha = .65$; public $\alpha = .74$; private $\alpha = .73$). Concurrent validity was supported by significant correlations among pre-experiment weight-related behavior intentions and pre-experiment self-report measures of dieting behavior and weight satisfaction (all $ps < .05$).

Hypothetical scenarios were presented to participants three times. First, they were administered during pre-experiment data collection. These data were analyzed to determine the normative (i.e., mean) response to each scenario among participants and define an “above average” maladaptive response for each scenario (i.e., ± 1 SD). These “above average” maladaptive weight-related responses were attributed to e-confederates in the context of the experimental paradigm. The second and third presentations of the hypothetical scenarios occurred within the experimental paradigm: (1) once in the presence of peers within the chatroom (i.e., to assess public conformity to weight-related behavior intention norms) and (2) then again in the absence of peers (i.e., to assess private acceptance of weight-related behavior intentions). Public conformity and private acceptance intention scores were used as dependent measures to examine the proposed hypotheses. Pre-experiment weight-related behavior intention was included as a covariate in all analyses.

Body Silhouettes—The Ideal Body Subscale (IBS-Female²⁸) consists of 12 numbered female silhouettes ranging in size from very thin (#1) to very obese (#12). This measure was administered at pre-experiment data collection to obtain data used in constructing experimental conditions. Specifically, pre-experiment responses to participants’ self-reported current body size, ideal body size, and most attractive body size silhouettes were used to identify silhouettes that would be considered thin or heavy within the study sample. E-confederates’ body size was manipulated across conditions by displaying thin or heavy body shapes that were ostensibly self-reported by these e-confederates at the start of the “chatroom” session.

Body Mass Index—Participants self-reported their birth date and current height and weight at the pre-experiment data collection. BMI-by-age percentiles (BMI) were determined using the CDC BMI-for-age growth chart for girls aged 2–20 years old.²⁹

Participants' self-reported baseline BMI was used in the stratified randomization procedure. The majority of participants reported having a healthy weight (5th–85th percentiles; 56.0%). A total of 3.0% were underweight (< 5th percentile), and 15.2% fell into the overweight (85th–95th percentiles; 9.1%) or obese (>95th percentile; 6.1%) categories. Seventeen participants (25.8%) provided insufficient data to calculate BMI.

Experimental Paradigm

The experimental paradigm simulated an Internet “chatroom” and was successfully developed and tested in prior research.¹³ Participants were told that the purpose of the study was to understand “how adolescents communicate over the Internet” and that they would have an opportunity to communicate electronically via an Internet chatroom with three female peers from their grade who ostensibly were working on computers in other rooms throughout the school. In reality, the three grade-mates in each participant’s chatroom were preprogrammed, computer-generated e-confederates. The popularity and body size of the e-confederates were manipulated across experimental conditions, as discussed above. The electronic paradigm was elaborately programmed to appear as a functional Internet browser and “chatroom” website, and was created using the Direct RT computer program.³⁰

Upon arrival at the computer kiosk, participants were informed that the chatroom was programmed to allow adolescents to communicate with each other in a specific order (Participant 1 responds first, Participant 2 responds second, etc.), that the order was randomly determined, and that chatroom participants would be answering a series of multiple-choice questions. In fact, the response order was predetermined to ensure that all participants responded fourth (i.e., last). This design guaranteed that participants would be exposed to the responses (i.e., social norms) of the e-confederates (i.e., “Participants” 1, 2, and 3) before providing their own responses. Once the participant had received this brief orientation, a computer-generated image of an Internet homepage associated with the researchers’ university was displayed. Throughout the entire experiment, participants only interacted with a simulated web browser on the computer’s hard drive and were not actually connected to the Internet or in a functional chatroom.

Before entering the chatroom “website,” participants were asked via computer-generated instructions to provide some personal background information for the ostensible purpose of acquainting chatroom members. Participants entered the first name and last initial of each of their two best friends in their grade, identified their two favorite activities from a list, and chose the body silhouette that best represented their current body size. In order to encourage accurate responses, participants were informed that they would have the opportunity to meet the other chatroom members in person at the end of the experiment. After providing this background information, participants “logged on” to the chatroom. The authenticity of this process was bolstered by several screens that displayed messages such as “Downloading Participant Information” and associated gauges indicating the progress of the download.

Within the chatroom, each of the three e-confederates and the participant had a response window associated with their identity in which their personal background information (i.e., best friends, hobbies, body silhouette) was posted. Participants were told that all on-screen information was visible to all chatroom members (i.e., e-confederates). Background

information for the participant and the three e-confederates remained on screen during participants' time in the chatroom and was thus understood to be continuously visible to all chatroom members.

Background information (i.e., two best friends, hobbies, silhouettes) was manipulated to imply popularity and body size of the e-confederates. Friendship nominations and popularity levels collected during the pre-experiment sociometric assessment provided information that identified: (1) the names of grade-mates who had been rated by students as either high or average popularity and (2) friendship groups composed of grade-mates with similar levels of popularity (i.e., either high or average). E-confederates' popularity status was communicated by listing either two popular or two average status female friends, based on the actual high or average popularity friendship groups that emerged from the sociometric nominations. The credibility of the experimental manipulation was increased by including the first names and last initials of girls who actually were members of the same friendship group within the participants' grade.

Given the ethnic composition of the sample, e-confederates were based on friendship nominations of White participants to minimize confounding of effects due to potential differences in weight-related norms across ethnic groups. Additionally, in order to minimize any confounding effects of likeability, all e-confederate friends had similar levels of popularity and likeability (i.e., high on both popularity and likability, average on both popularity and likeability). The mean popularity and likeability scores of the e-confederates' friends were significantly higher in the high popularity peer condition than in the average popularity peer condition (popularity: $M_{popular} = 1.21$ versus $M_{average} = -0.52$; $t(10) = 9.48$, $p < .001$; likeability: $M_{popular} = 0.88$ versus $M_{average} = -0.44$; $t(10) = 3.29$, $p < .001$).

The manipulation of popularity was further strengthened by providing general information about e-confederates' favorite activities, ostensibly reported by the e-confederates. Focus groups with adolescents were used to identify hobbies that might suggest higher popularity (e.g., "going to parties") and lower popularity (e.g., "studying for school").

The body size (i.e., thin or heavy) of the e-confederates was experimentally manipulated via the body silhouette presented onscreen for each e-confederate. Thin silhouettes were either at, or one silhouette thinner than, the modal response to the "ideal" and "most attractive" body questions ($M_{attractive} = 4.33$; $median_{attractive} = 4.00$; $mode_{attractive} = 4.00$; $M_{ideal} = 4.28$; $median_{ideal} = 4.00$; $mode_{ideal} = 4.00$). Heavy silhouettes were either at, or one silhouette heavier than, the largest current body size silhouette that was selected by multiple participants (silhouette #7).

Using stratified randomization based on participants' popularity, BMI, pre-experiment perceived body size, and ethnicity (White or non-White), participants were randomly assigned to one of three experimental conditions: (1) Thin & Popular; (2) Thin & Average; or (3) Heavy & Average. Across conditions, either body silhouette or popularity indicators (i.e., e-confederate friends and hobbies) were held constant to help isolate which characteristics might be related to weight-related peer influence processes. Specifically, the same "thin" body silhouettes were presented in both the Thin & Popular and Thin &

Average conditions to represent thin body size of the e-confederates (i.e., the “thin” conditions). Similarly, the same less popular e-confederate friends and hobbies were presented in both the Thin & Average and Heavy & Average conditions to suggest average popularity of the e-confederates (i.e., the “lower popularity” conditions).

Chatroom Experience—Within the chatroom, the hypothetical weight-related scenarios and associated response options (labeled “a,” “b,” “c,” etc.) were presented one at a time to participants. Participants responded to each scenario only after they had seen the responses of each of the three e-confederates. E-confederate responses were generated by the computer program, presented to participants sequentially, and suggested norms of maladaptive weight-related attitudes and behaviors. To increase the credibility of the chatroom, e-confederate responses were timed such that there was a pause before each e-confederate’s response to suggest she was deliberating before answering. These pauses varied across e-confederates and across trials. Additionally, e-confederates gave slightly different answers to a given item (e.g., “Participant” 1 might answer “d,” and “Participants” 2 and 3 might answer “e”), but e-confederate answers always fell on the maladaptive side of the response scale. This maximized both the believability of the design and the possibility of participants experiencing peer influence on weight-related behavior intent. Although the content and the timing of responses varied across e-confederates within each chatroom, both the content and timing of e-confederates’ responses remained constant across the three experimental conditions.

Post-Chatroom Measures and Manipulation Check—After responding to the scenarios in the “public” chat-room, participants were introduced to a “private session” within the experiment. This “private session” was designed to assess the extent to which peer influence might impact private intentions, as well as the success of the manipulations. Participants were told that this private session involved responding to questions while temporarily “logged off” from the chatroom. Participants were shown an animated “logging off” indicator, following which the response windows for each of the three e-confederates were removed from the screen and participants were informed that neither their own, nor the other “participants” responses, would be displayed publicly in the chatroom. Participants were presented again with each hypothetical scenario and provided responses for weight-related behavior intent. After completing the hypothetical scenarios within the private session, participants were asked to rate the “popularity within their school” of each e-confederate individually (1 = *extremely popular* to 7 = *extremely unpopular*), and the extent to which each e-confederate had an “ideal” body (1 = *most ideal* to 7 = *least ideal*), to assess the extent to which the manipulation was perceived as intended.

Debriefing—A funnel debriefing was conducted after all participants had completed the experimental paradigm. Debriefing included discussions with participants explaining: (a) the deceptive elements of the study, including the inaccurate weight-related behavior norms; (b) why these elements were necessary given the hypotheses under investigation; (c) why it was essential to withhold this information until the end of the study; (d) a request for participants not to share information regarding the study’s true purpose with peers; and (e) an opportunity to answer any questions and address concerns. Through debriefing it was

possible to identify plausibility issues, as well as participants who may have been suspicious of the “chatroom.” Sixty-six of the original 68 participants reported having believed that all aspects of the chatroom were real.

Data Analysis

Analyses were conducted following recommendations for randomized pretest, post-test, and follow-up designs by Rausch, Maxell, and Kelley.³¹ Two analyses of covariance (ANCOVA) were estimated in SPSS 19 to examine the two study hypotheses: (1) participants in the Thin & Popular condition would report the most maladaptive weight-related behavior intentions, and (2) peer influence effects would impact private weight-related intentions most strongly for participants in the Thin & Popular condition. To test Hypothesis 1, participants’ public weight-related behavior intent was the dependent variable, with condition entered as a between-subjects variable and participants’ pre-experiment weight-related behavior intent as a covariate. To test Hypothesis 2, a difference score between participants’ public and private weight-related behavior intent scores was calculated. This difference score was the dependent variable, with condition entered as a between-subjects variable and participants’ pre-experiment weight-related behavior intent as a covariate. Contrasts using the Thin & Popular condition as the reference group were examined within both ANCOVAs.

Results

Manipulation Check

One-way ANOVAs with Tukey post-hoc comparisons were conducted to compare participants’ perceptions of e-confederates’ popularity and idealness of body size across conditions. As expected, all e-confederates in the high popularity condition were perceived as significantly more popular than the e-confederates in the average popularity conditions (averages listed for ease of presentation: $F(2,63) = 13.69, p < .001$; $M_{Thin \& \text{ Popular}} = 3.2$ versus $M_{Thin \& \text{ Average}} = 4.42, M_{Heavy \& \text{ Average}} = 4.80$). Similarly, all e-confederates in the thin conditions generally were perceived as having significantly more ideal bodies than the e-confederates in the heavy condition ($F(2,63) = 10.30, p < .001$; $M_{Thin \& \text{ Popular}} = 3.42, M_{Thin \& \text{ Average}} = 3.97$ versus $M_{Heavy \& \text{ Average}} = 4.99$). These findings suggest that conditions were perceived differently, and as intended; thus, hypotheses were tested as described above.

Peer Influence on Public Conformity to Maladaptive Weight-Related Behavior Intentions

An ANCOVA revealed a significant effect of condition on participants’ intention to engage in unhealthy weight-related behaviors after controlling for the effect of pre-experiment levels of intent, $F(2) = 3.93, p = .025$, partial eta squared .11 (Table 1). The observed pattern partially supported hypotheses. Planned contrasts using the Thin & Popular condition as the reference group revealed that participants in the Heavy & Average condition reported significantly less intention to engage in maladaptive weight-related behaviors than participants in the Thin & Popular condition, $p = .04$, 95% CI [-0.72, -0.02]. There was no significant difference between weight-related behavior intention reported by girls in the Thin & Popular condition versus those in the Thin & Average condition, $p = .67$, 95% CI [-0.28,

0.43] (Fig. 1). The hypothesis that participants exposed to maladaptive weight-related behavior norms by thin and popular peers would demonstrate the highest levels of public conformity to maladaptive weight-related behavior intent was not supported. Participants' weight-related behavior intent varied based on body size of the peers communicating maladaptive weight-related behavior norms, but did not appear to be impacted by popularity status.

Post-hoc one-sample *t*-tests were conducted to test whether mean level of public conformity to chatroom maladaptive weight-related behavior intent was significantly different from the pre-experiment sample mean (i.e., 0) within each condition. Public conformity to maladaptive weight-related behavior intent in neither the Thin & Popular nor the Thin & Average condition was significantly different from zero ($t(19) = .80, p = .44$; $t(22) = 1.48, p = .15$, respectively). Weight-related behavior intent in the Heavy & Average condition was significantly different from 0 ($t(22) = -2.24, p = .04$); however, participants in this condition did not demonstrate public conformity to maladaptive weight-related behavior intent. Instead, participants in the Heavy & Average condition indicated significantly more *adaptive* weight-related behavior intent compared to the pre-experiment average. Only participants exposed to maladaptive weight-related behavior norms communicated by heavy and average popularity peers reported weight-related behavior intent that was significantly different from the pre-experimental average of weight-related behavior intent.

Peer Influence Effects on Private Acceptance of Maladaptive Weight-Related Behavior Intention

The second hypothesis posited that participants exposed to thin and popular e-confederates would demonstrate the greatest consistency between public conformity and private acceptance of maladaptive weight-related behavior intention. This hypothesis was not supported. An ANCOVA revealed no effects of condition on change in intention to engage in maladaptive weight-related behaviors from public conformity to private acceptance after controlling for pre-experiment levels of intent, $F(2) = .47, p = .63$, partial eta squared = .02 (Table 1). Planned contrasts revealed no significant differences of peer influence on private acceptance of weight-related behavior intent between responses of participants in the Thin & Popular and Thin & Average conditions, $p = .47$, 95% CI [-0.28, 0.13], or between responses of participants in the Thin & Popular and Heavy & Average conditions, $p = .36$, 95% CI [-0.30, 0.11] (Fig. 2). Change in participants' weight-related behavior intent from the public to the private setting was similar across conditions, suggesting that peer influence similarly affected private intentions.

Discussion

This study used a novel experimental design to examine the social context most likely to promote peer influence of adolescents' weight-related behavior intentions. Results revealed that within this sample the body size of the comparison peers was most relevant to adolescent girls' public conformity to weight-related behavior intent. Unhealthy weight-related behavior intentions were significantly lower in the Heavy & Average condition than in either of the thin peer conditions. Contrary to hypotheses, there was no distinction in level

of response between the Thin & Popular and Thin & Average conditions, suggesting that the popularity of comparison peers may not augment peer influence effects on participants' maladaptive weight-related behavior intent. This was unexpected given the literature supporting associations between popularity and thinness^{15,16} and past results indicating that the popularity of the peer amplifies influence effects for other health risk and deviant behaviors.^{13,14} It is important to note that the experiment did not include a Heavy & Popular condition, which would have provided a more definitive answer to the question of popularity as an influential characteristic. Previous research suggests that the combination of being both a heavy and popular girls is significantly less common,^{15,16} and our baseline data support this as there were no heavy and popular girls with whom a Heavy & Popular condition could be constructed. As compared to other peer influence processes, it appears that within a population lacking heavy and popular girls, the *body size* as opposed to the *popularity* of the comparison peer may have the greatest effect on peer influence on weight-related behavior intentions.

Responses elicited in the Heavy & Average condition also suggested an anti-conformity effect of peer influence. Participants exposed to maladaptive weight-related norms conveyed by heavy peers responded significantly *less* maladaptively than participants exposed to thin peers. Responses in the Heavy & Average condition actually indicated significantly greater intent to engage in adaptive weight-related behaviors, compared to the pre-experiment sample mean of weight-related behavior intent (i.e., zero; see Fig. 1). Although social comparison theory and the prototype/willingness model provide one overarching framework for understanding why adolescents may engage in health risk behaviors, deviance regulation theory³² suggests another way to understand participants responding more adaptively when risky norms were communicated by potentially less desirable peers. Deviance regulation theory posits that individuals self-regulate on the basis of perceived social consequences of deviating from the norm. It may be that participants exposed to heavy and average popularity peers perceived a negative health message associated with maladaptive weight-related behaviors and attitudes. More specifically, the norms in the Heavy & Average condition may have communicated that adolescents who engage in maladaptive eating behaviors are neither thin nor popular. Although popularity did not emerge as a distinguishing factor between participants' responses in the two thin peer conditions within this sample, there may be an amplification effect when lower popularity status is paired with an undesirable body shape. These findings, however, also should be considered in the context of lacking a Heavy & Popular condition. There may be schools in which there are indeed popular and heavy girls. It is possible that peer influence on unhealthy weight-related behaviors occurring in a context in which heavy girls are popular may evoke a different pattern of results than those observed in this study.

In addition to examining what peer attributes may be relevant to the peer influence process, the extent to which peer influence impacted private acceptance of weight-related behavior intentions was explored. It was anticipated that peer influence effects on private acceptance of maladaptive weight-related behavior intention would be greatest for participants in the Thin & Popular condition. In fact, the impact of the e-confederates on weight-related behavior intentions appeared to persist similarly from the public to private setting within all

conditions. Even when participants believed their responses were private, they reported similar weight-related behavior intent as they had in a public setting. Although the study was powered to detect large effects, the findings suggest that it is possible that peer influence could impact private acceptance of maladaptive weight-related behaviors. As unhealthy weight-related behaviors may or may not occur within a peer context (e.g., skipping lunch at school versus over-exercising at home alone), it is important to consider that peers may impact girls' maladaptive weight-related behaviors outside the peer context.

Theories and findings regarding peer influence on weight-related behavioral intentions have important implications for new interventions. For example, combining a dissonance-based approach¹⁸ with deviance regulation theory³² may allow the flexibility for an intervention to be tailored to a particular peer context. Dissonance approaches can be used to address positive associations with thinness and weight loss, while deviance-regulation theory could inform the framing of adaptive weight-related messages.

This study contributes to the peer influence literature in five ways. First, this study used a novel experimental paradigm to test peer influence hypotheses. Although there is a large literature supporting peer influence on a variety of behaviors during adolescence, there is a dearth of experimental research. Second, this study extended existing peer influence findings by considering peer characteristics that may amplify peer influence effects and by examining possible impact on private attitudes, with important clinical implications. Third, this study used a multidisciplinary approach by integrating developmental, social, health, and clinical psychology literatures. Fourth, the weight-related behaviors scenarios were developed using focus groups, and thus reflect realistic situations, behaviors, and attitudes related to body image and dieting experienced by adolescent girls. Fifth, this research examined peer influence processes during an important developmental transition. Early adolescence is a period during which peers and body size and shape are particularly salient to girls.

Limitations

There were a number of limitations to this study that should be considered. As previously discussed, the study did not include a Heavy & Popular condition, which limits the extent to which popularity may be interpreted as a distinguishing peer influence factor among the experimental conditions. Floor effects are possible given that only high and average popularity comparison peers were included as e-confederates. The study included a small sample and was powered to detect large effects. All study manipulations were created using data from White participants. Although this was intended to contribute to more interpretable findings given the complex contextual nature of body image and weight-related behaviors across ethnic/minority groups,³³⁻³⁵ results may not generalize. In addition to possible variation among weight-related norms, popularity and likeability within each ethnic group should be considered. It may be that adolescents are most influenced by same-ethnicity popular peers who are more likely to have similar body ideals. Future research should assess the duration of the impact of peer influence on private weight-related behavior intent, as well as possible moderators of this duration. This research used a risk factor framework and the experimental chatroom paradigm also can be used to consider possible protective factors.

The psychometrics of the hypothetical weight-related behavior scenarios should be examined further, especially among racial/ethnic minority adolescents. Last, it is important to recognize that the results of this study may represent patterns of peer influence on disordered eating behaviors of relatively healthy adolescent girls within a specific school in which there did not appear to be any heavy and popular girls.

Conclusion

Overall, results suggest that body size of comparison peers may be the most salient factor in peer influence on girls' weight-related behavior intentions; popularity did not amplify the peer influence process as hypothesized. Importantly, anticonformity effects were observed in the heavy experimental condition. Additionally, across all conditions, peer influence effects were maintained outside the peer context, highlighting the important role that peers may play in adolescents' private acceptance of weight-related behaviors. The observed peer influence effects suggest that local weight-related behavior norms should be considered within prevention/intervention programs. Replication is needed to examine the generalization of the observed effects, and future research should explore differences across ethnicities and ages, as well as potential moderators of both positive and negative peer influence on adolescent girls' weight-related behaviors.

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References

1. Neumark-Sztainer D, Wall M, Guo J, Story M, Haines J, Eisenberg M. Obesity, disordered eating, and eating disorders in a longitudinal study of adolescents: How do dieters fare 5 years later? *J Am Diet Assoc.* 2006; 106:559–68. [PubMed: 16567152]
2. Neumark-Sztainer D, Wall M, Larson NI, Eisenberg ME, Loth K. Dieting and disordered eating behaviors from adolescence to young adulthood: Findings from a 10-year longitudinal study. *J Am Diet Assoc.* 2011; 111:1004–1011. [PubMed: 21703378]
3. Neumark-Sztainer D, Wall M, Story M, Standish AR. Dieting and unhealthy weight control behaviors during adolescence: Associations with 10-year changes in body mass index. *J Adolesc Health.* 2012; 50:80–86. [PubMed: 22188838]
4. Eisenberg ME, Neumark-Sztainer D, Story M, Perry C. The role of social norms and friends' influences on unhealthy weight-control behaviors among adolescent girls. *Soc Sci Med.* 2005; 60:1165–1173. [PubMed: 15626514]
5. Paxton SJ, Schutz HK, Wertheim EH, Muir SL. Friendship clique and peer influences on body image concerns, dietary restraint, extreme weight-loss behaviors, and binge eating in adolescent girls. *J Abnorm Psychol.* 1999; 108:255–266. [PubMed: 10369035]
6. Eisenberg ME, Neumark-Sztainer D. Friends' dieting and disordered eating behaviors among adolescents five years later: Findings from Project EAT. *J Adolesc Health.* 2010; 47:67–73. [PubMed: 20547294]
7. Mueller AS, Pearson J, Muller C, Frank K, Turner A. Sizing up peers: Adolescent girls' weight control and social comparison in the school context. *J Health Soc Behav.* 2010; 51:64–78. [PubMed: 20420295]
8. Festinger L. A theory of social comparison processes. *Human Relations.* 1954; 7:117–140.

9. Carlson Jones D. Body image among adolescent girls and boys: A longitudinal study. *Dev Psychol.* 2004; 40:823–835. [PubMed: 15355169]
10. Myers TA, Crowther JH. Social comparison as a predictor of body dissatisfaction: A meta-analytic review. *J Abnorm Psychol.* 2009; 118:683–698. [PubMed: 19899839]
11. Gibbons, FX.; Gerrard, M.; Lane, DJ. A social reaction model of adolescent health risk. In: Suls, J.; Wallston, KA., editors. *Blackwell Series in Health Psychology and Behavioral Medicine.* Malden: Blackwell Publishing; 2003. p. 107-136.
12. Adler, PA.; Adler, P. *Peer Power: Preadolescent Culture and Identity.* Vol. xii. Piscataway, NJ: Rutgers University Press; 1998. p. 255
13. Cohen GL, Prinstein MJ. Peer contagion of aggression and health risk behavior among adolescent males: An experimental investigation of effects on public conduct and private attitudes. *Child Dev.* 2006; 77:967–983. [PubMed: 16942500]
14. Engels RCME, Scholte RHJ, van Lieshout CFM, de Kemp R, Overbeek G. Peer group reputation and smoking and alcohol consumption in early adolescence. *Addict Behav.* 2006; 31:440–449. [PubMed: 16046078]
15. Rancourt D, Prinstein MJ. Peer status and victimization as possible reinforcements of adolescent girls' and boys' weight-related behaviors and cognitions. *J Pediatr Psychol.* 2010; 35:354–367. [PubMed: 19667053]
16. Wang SS, Houshyar S, Prinstein MJ. Adolescent girls' and boys' weight-related health behaviors and cognitions: Associations with reputation- and preference-based peer status. *Health Psychol.* 2006; 25:658–663. [PubMed: 17014285]
17. Becker CB, Smith LM, Ciao AC. Peer-facilitated eating disorder prevention: A randomized effectiveness trial of cognitive dissonance and media advocacy. *J Couns Psychol.* 2006; 53:550–555.
18. Stice E, Marti CN, Spoor S, Presnell K, Shaw H. Dissonance and healthy weight eating disorder prevention programs: Long-term effects from a randomized efficacy trial. *J Consult Clin Psychol.* 2008; 76:329–340. [PubMed: 18377128]
19. Faul F, Erdfelder E, Lang A-G, Buchner A. GPower 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav Res Methods.* 2007; 39:175–191. [PubMed: 17695343]
20. Cillessen, AHN. Sociometric methods. In: Rubin, KH.; Bukowski, WM.; Laursen, B., editors. *Handbook of Peer Interactions, Relationships, and Groups.* New York: Guilford; 2008. p. 82-99.
21. Parkhurst JT, Hopmeyer A. Sociometric popularity and peer-perceived popularity: Two distinct dimensions of peer status. *J Early Adolesc.* 1998; 18:125–144.
22. Coie JD, Dodge KA. Continuities and changes in children's social status: A five-year longitudinal study. *Merrill Palmer Quart.* 1983; 29:261–282.
23. Cillessen, AHN.; Mayeux, L. Sociometric status and peer group behavior: Previous findings and current directions. In: Kupersmidt, JB.; Dodge, KA., editors. *Decade of Behavior.* Washington, DC: American Psychological Association; 2004. p. 3-20.
24. Prinstein, MJ.; Rancourt, D.; Guerry, JD.; Browne, CB. Peer reputations and psychological adjustment. In: Rubin, KH.; Bukowski, WM.; Laursen, B., editors. *Social, emotional, and personality development in context.* New York, NY: Guilford Press; 2009. p. 548-567.
25. Bell-Dolan DJ, Foster SL, Sikora DM. Effects of sociometric testing on children's behavior and loneliness in school. *Dev Psychol.* 1989; 25:306–311.
26. Nejad LM, Wertheim EH, Greenwood KM. Predicting dieting behavior by using, modifying, and extending the theory of planned behavior. *J Appl Soc Psychol.* 2004; 34:2099–2131.
27. Sheeran P. Intention-behavior relations: A conceptual and empirical review. *Eur Rev Social Psychol.* 2002; 12:1–36.
28. Cogan JC, Bhalla SK, Sefa-Dedeh A, Rothblum ED. A comparison study of United States and African students on perceptions of obesity and thinness. *J Cross Cult Psychol.* 1996; 27:98–113.
29. Mei Z, Grummer-Strawn LM, Pietrobelli A, Goulding A, Goran MI, Dietz WH. Validity of body mass index compared with other body-composition screening indexes for the assessment of body fatness in children and adolescents. *Am J Clin Nutr.* 2002; 75:978–985. [PubMed: 12036802]
30. Jarvis, B. 2004. Available from: <http://support.empirisoft.com/showthread.php?t=18>

31. Rausch JR, Maxwell SE, Kelley K. Analytic methods for questions pertaining to a pretest posttest follow-up design. *J Clin Child Adolesc Psychol.* 2003; 32:467–486. [PubMed: 12881035]
32. Blanton H, Stuart AE, VandenEijnden RJJM. An introduction to deviance-regulation theory: The effect of behavioral norms on message framing. *Pers Soc Psychol B.* 2001; 27:848–858.
33. Abrams LS, Stormer CC. Sociocultural variations in the body image perceptions of urban adolescent females. *J Youth Adolesc.* 2002; 31:443–450.
34. Croll J, Neumark-Sztainer D, Story M, Ireland M. Prevalence and risk and protective factors related to disordered eating behaviors among adolescents: Relationship to gender and ethnicity. *J Adolesc Health.* 2002; 31:166–175. [PubMed: 12127387]
35. Wildes JE, Emery RE. The roles of ethnicity and culture in the development of eating disturbance and body dissatisfaction: A meta-analytic review. *Clin Psychol Rev.* 2001; 21:521–551. [PubMed: 11413866]

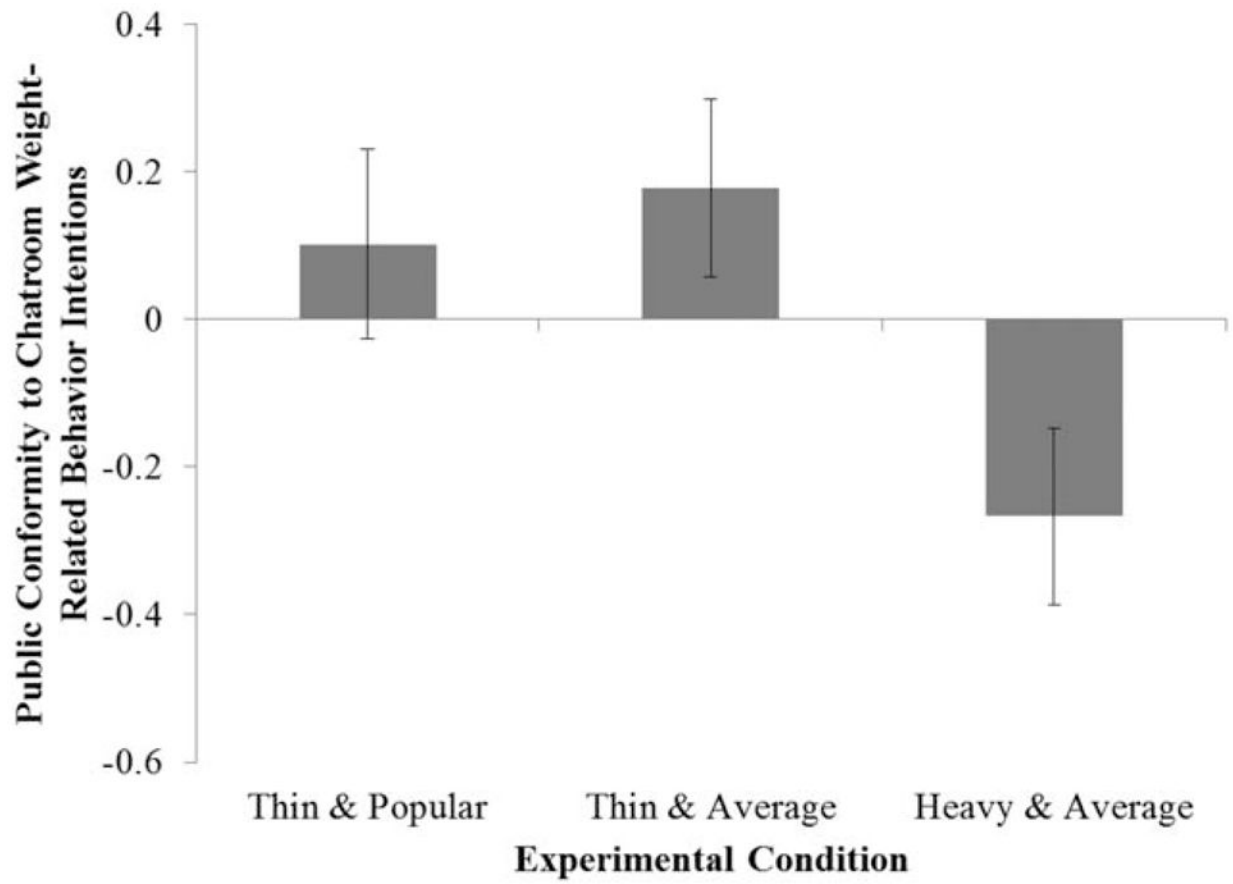


FIGURE 1.

Public conformity to chatroom weight-related behavior intentions by experimental condition. “Average” = average popularity. Scores presented are adjusted means of participants’ reported weight-related behavior intentions within the chatroom in the presence of “peers.” Standard errors are represented by the error bars on each column.

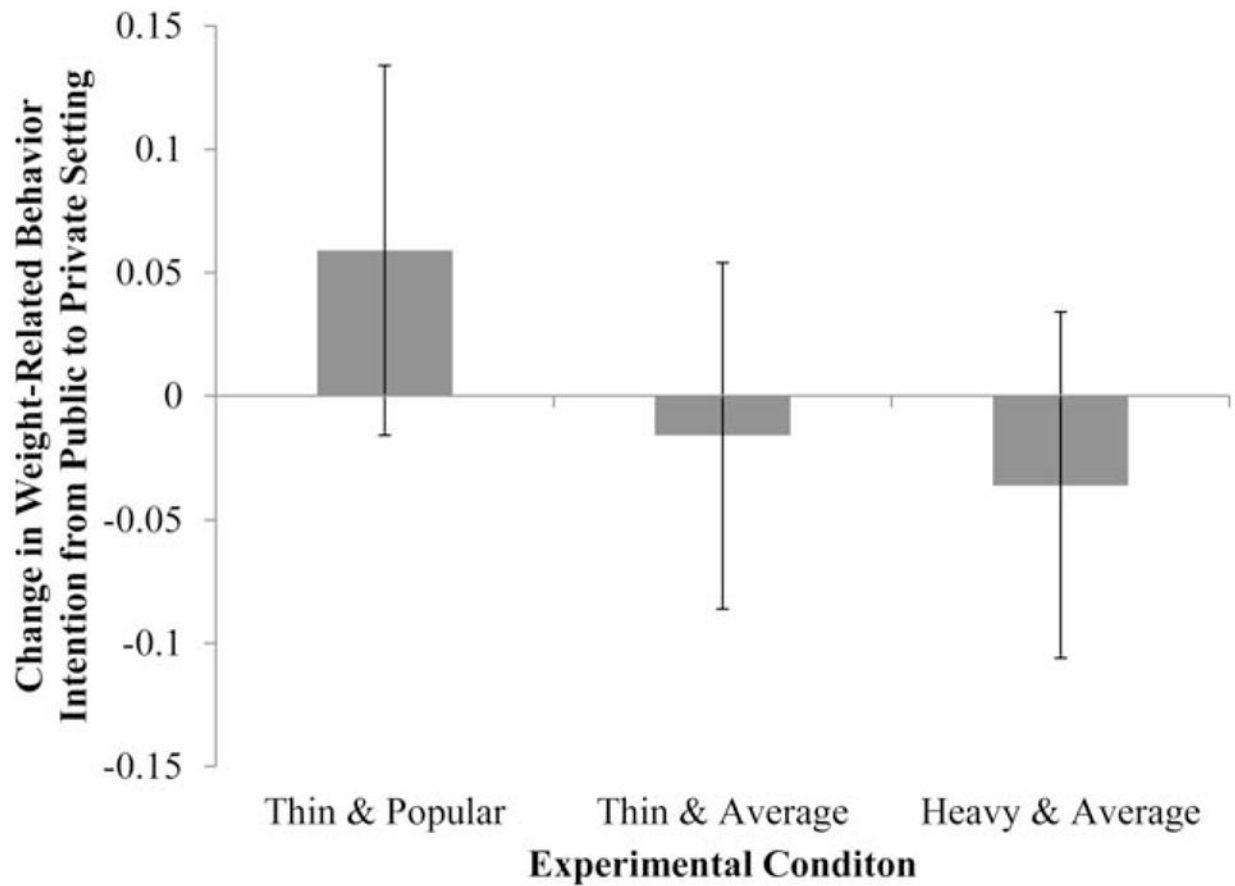


FIGURE 2.

Difference scores of public conformity to chatroom weight-related behavior intentions and private acceptance of weight-related behavior intentions by experimental condition. “Average” = average popularity. Scores presented are adjusted difference score means of the difference between participants’ publically reported weight-related behavior intentions (i.e., in the chatroom) and their subsequent private report of weight-related behavior intentions (i.e., not in the chatroom). Standard errors are represented by the error bars on each column.

ANCOVA estimates of peer influence effects on public conformity to and private acceptance of weight-related behavior intention across conditions

TABLE 1

	<u>Peer Influence on Public Conformity</u>		<u>Peer Influence on Private Acceptance</u>	
	<u><i>F</i>(1, 62)</u>	<u><i>p</i></u>	<u>Partial η^2</u>	<u>Difference Score: Public-Private Weight-Related Behavior Intention</u>
Overall Model	<i>F</i>(3, 62) = 8.47	.00	0.29	<i>F</i> (3, 62) = 1.04 .38
Condition	<i>F</i>(2, 62) = 3.93	.03	0.11	<i>F</i> (2, 62) = .47 .63
Pre-Exp. WRB	<i>F</i>(1, 62) = 18.19	.00	0.23	<i>F</i> (1, 62) = 2.42 .13

Note. Pre-Exp. WRB = Pre-Experiment Weight-Related Behavior Intention. Public Weight-Related Behavior Intention reported in the public chatroom setting. Private Weight-Related Behavior Intention reported in the private chatroom setting that immediately followed the public chatroom. Significant parameter estimates are in boldface. Partial η^2 represents the unique proportion of variance accounted for by each variable.