Unspoken Cultural Influence: Exposure to and Influence of Nonverbal Bias

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The authors examined the extent to which nonverbal behavior contributes to culturally shared attitudes and beliefs. In Study 1, especially slim women elicited especially positive nonverbal behaviors in popular television shows. In Study 2, exposure to this *nonverbal bias* caused women to have especially slim cultural and personal ideals of female beauty and to have especially positive attitudes toward slim women. In Study 3, individual differences in exposure to such nonverbal bias accounted for substantial variance in pro-slim attitudes, anti-fat attitudes, and personal ideals of beauty, even after controlling for several third variables. In Study 4, regional differences in exposure to nonverbal bias accounted for substantial variance in regional unhealthy dieting behaviors, even after controlling for several third variables.

Keywords: social influence, nonverbal behavior, prejudice, body image

Most Americans believe in a Christian God (Pew, 2007), value slim female bodies (Striegel-Moore & Franko, 2002), and think that it is good to have a democratic political system (World Values Survey, 2005). Explanations for such culturally shared beliefs range from evolutionary (Krebs & Janicki, 2004) to epistemological (Hardin & Higgins, 1996) to existential (Greenberg, Solomon, & Pyszczynski, 1997), and empirical evidence for all three perspectives exists. More proximal explanations for the communicative processes underlying shared beliefs are also supported by empirical evidence (e.g., Hardin & Higgins, 1996; Latane, 1996). Building on this literature, we examine a largely overlooked process in the propagation of shared beliefs.

We argue that nonverbal behavior plays a subtle but influential role in communicating the beliefs of a culture and in eliciting belief-consistent cognition and behavior. Specifically, nonverbal behavior can be biased, such that certain social categories (or stimuli) are nonverbally favored or derogated. Exposure to such nonverbal behavior then influences beliefs about the relative value of those social categories. Widespread exposure to such nonverbal biases is likely to result in culturally shared attitudes, beliefs, and behavior.

Extracting Information From Nonverbal Behavior

Central to our argument is the idea that people efficiently extract a great deal of information from the nonverbal behaviors of others

and then use this information to form impressions of the world around them. Indeed, people are extremely sensitive to others' nonverbal behavior. Facial expressions, body movement, and tone of voice guide inferences about the emotions, intentions, attitudes, and personality traits of others (e.g., Argyle & Cook, 1976; Baron-Cohen, 1995; Berry, 1991; Ekman, 1982; Mehrabian, 1972; Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979). These inferences can be made intentionally or unintentionally, and in most cases, nonverbal inferences can be made extremely quickly (Ambady & Rosenthal, 1992; Pessoa, Japee, & Ungerleider, 2005; Williams et al., 2004). For example, emotions can be extracted from facial expressions or body movements in mere milliseconds (Bar, Neta, & Linz, 2006; McLeod & Rosenthal, 1983; Pessoa, Japee, Sturman, & Ungerleider, 2006; Pessoa et al., 2005; Rosenthal et al., 1979; Williams et al., 2004). Personality, sexuality, and liking can all be extracted from several seconds of nonverbal behavior (see Ambady, Bernieri, & Richeson, 2000). Moreover, accurate information can be extracted from extremely degraded nonverbal stimuli. For example, gender, identity, and deceit can be extracted from human movements indicated only by the dynamic movement of points corresponding to joints or limbs (Cutting & Kozlowski, 1977; Kozlowski & Cutting, 1977; Runeson & Frykholm, 1983). In short, people are closely attuned to the meaning of others' nonverbal behavior.

The meaning that perceivers derive from others' nonverbal behavior has important implications for those perceivers. For example, initial impressions formed from exposure to nonverbal behavior often hold sway over subsequent impressions of target persons (Ambady & Rosenthal, 1992; Dougherty, Ebert, & Callender, 1986). More important for our purposes, nonverbal behavior directed at a target person can influence the target's own behavior (e.g., Harris & Rosenthal, 1985). In one illustrative study, interviewers were instructed to exhibit negative or positive nonverbal responses to interviewees (Word, Zanna, & Cooper, 1974). Interviewees inferred that the negative interviewer was unfriendly and performed worse with this interviewer, compared with the positive interviewer. A substantial number of interpersonal expectancy studies report similar findings (e.g., Harris & Garris, 2008;

Harris & Rosenthal, 1985), suggesting that information extracted from others' nonverbal behavior influences perceiver behavior. In summary, people appear to extract a great deal of information from others' nonverbal behavior, and this information influences beliefs and behavior.

Although there is substantial evidence that people extract information from and are influenced by nonverbal behaviors directed at them, there is a paucity of evidence regarding how people are influenced by nonverbal behaviors directed at others. Our thesis is that (a) people are influenced by nonverbal behavior directed at certain social categories, and (b) such bias may exert widespread effects upon a culture. In general, we argue that exposure to nonverbal bias contributes heavily to the attitudes and beliefs shared within a culture.

Nonverbal Bias

We use the term *nonverbal bias* to refer to nonverbal behaviors that vary systematically as a function of a target's social category. For example, nonverbal bias occurs when nonverbal behavior is especially positive toward Caucasians, slim women, or New York Yankees' fans and especially negative toward Hispanics, heavy women, or Boston Red Sox fans. There is ample evidence that nonverbal biases exist. For instance, African Americans, heavy women, and elderly adults have been shown to elicit more negative nonverbal behavior than European Americans, slim women, and young adults, respectively, in experimental and naturalistic situations (Chaikin, Sigler, & Derlega, 1974; Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997; Harris, Moniz, Sowards, & Krane, 1994; E. B. King, Shapiro, Hebl, Singletary, & Turner, 2006).

Nonverbal bias is also likely to be influential. That is, systematic biases in nonverbal behavior represent an environmental regularity, and people are remarkably attuned to such regularities (Lewicki, Hill, & Czyzewska, 1992). For example, if people are exposed to a social environment in which (short) shin-length and likability covary, they may conclude that short-shinned people are especially likable (Hill, Lewicki, Czyzewska, & Boss, 1989). People seem to be attuned to even the most subtle and minor regularities (see Lewicki et al., 1992), such that exposure to even a small correlation between race and athleticism may produce the belief that, for example, Black people are superior athletes. In short, people are attuned to environmental regularities, and beliefs about different sorts of people may be derived from these regularities (Lewicki et al., 1992).

As one such regularity, exposure to nonverbal bias may influence the beliefs and attitudes of a single perceiver, but such bias would have to be sufficiently prevalent within the culture for it to produce culturally shared beliefs and attitudes. An important point, then, is that widespread cultural influences of nonverbal bias depend on the prevalence of that bias. One purpose of the current research is to examine the extent to which people are frequently exposed to at least one type of nonverbal bias. Although it would be possible to make observations of nonverbal bias in a particular setting, such observations would have limited generalizability. Thus, we examined nonverbal bias within a communication medium known to reach millions of people: television.

The Cultural Influence of Nonverbal Bias: The Case of Female Body Size

Television provides an especially interesting and largely untapped medium for examining nonverbal behavior and its influence (but see Manusov & Jaworski, 2006). The number of television stations has skyrocketed over the last several decades, creating a substantial and diverse televised population. Of course, members of this population know that they are being videotaped, and many have been told exactly what to say and how to behave—thus, it is appropriate to consider "people who appear on television" as a population, rather than as a sample of the larger population. Much like politicians, military commanders, or religious leaders, the televised population should be considered an especially important and influential population, given that millions of people are exposed to television characters daily.

Media-effects theories model the cultural influence of television and other media (see Bryant & Zillman, 2002), and several of these theories support our hypotheses. Consistent with exemplification theory (Zillmann, 2002), repeated exposure to concrete behavior (here, nonverbal behavior) should exert especially strong social influence effects. Perceivers' estimates of prevalent attitudes are influenced substantially more by exposure to exemplars that illustrate attitudes than by exposure to explicitly stated base-rate information (Brosius & Bathelt, 1994)—these effects are especially strong with (nonverbally) emotional social exemplars (Aust & Zillmann, 1996). A very different media-effects model also supports our hypotheses. According to the cultivation perspective, with increasing exposure to television, viewers' subjective reality is increasingly shaped by the beliefs and ideologies existing on television (e.g., Gerbner & Gross, 1976). Consistent with this perspective, we expect viewers' subjective beliefs and attitudes about female bodies to reflect the world as (nonverbally) portrayed on television (see also Dalton et al., 2003).

The particular beliefs and attitudes that we examined were those relevant to body ideals. In fact, much has been made of the prevalence of slim female bodies on television. For example, many have argued that such prevalence is, in part, responsible for Western problems of female body image and eating disorders (e.g., Kilbourne, 1999; Levine & Smolak, 1996; Rodin, Silberstein, & Striegel-Moore, 1985; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), and there is some empirical support for this idea (e.g., Birkeland et al., 2005; Dittmar & Howard, 2004; Groesz, Levine, & Murnen, 2002; Keel & Klump, 2003; Lindberg & Hjern, 2003). In our view, female body ideals are also likely to be influenced by the degree to which slim (as opposed to heavier) characters are treated well by other television characters. In the current research, we investigated the extent to which individuals in Western culture were (a) widely exposed to and (b) influenced by nonverbal bias favoring especially slim women. If people in Western culture are widely exposed to and influenced by such nonverbal bias, then it is likely that nonverbal bias plays a role in producing culturally shared beliefs and behavior.

We conducted four studies to test our hypotheses. Study 1 examined the extent to which nonverbal bias in favor of especially slim women was depicted on popular television. Study 2 examined the extent to which exposure to such nonverbal bias *influenced* women's body-related attitudes and beliefs. Study 3 examined the extent to which individual differences in media exposure to non-

verbal bias could account for body-related attitudes, beliefs, and behavior. Finally, Study 4 examined the extent to which regional rates of unhealthy dieting were attributable to regional exposure to nonverbal bias.

Study 1

Method

Overview and Hypothesis

The purpose of Study 1 was to examine cultural exposure to one type of nonverbal bias. Several 10-s video clips were created for each female character from 18 popular scripted television shows (airing nationally). These clips were chosen in accordance with a predetermined algorithm (e.g., first and last social interaction from each show). To obtain an unbiased estimate of nonverbal liking for each character, we digitally removed the rated character and the audio track from each clip. Thus, all that was visible was other characters' nonverbal responses to the rated character. Television-naïve judges rated the extent to which the digitally removed character was liked. A separate group of judges rated the body size of each character from still images included in the 10-s clips. Thus, each featured character received a "nonverbal liking" score and a "body size" score.

On the basis of research suggesting that pro-slim, anti-fat attitudes are prevalent within America (Crandall, 1994; Thompson et al., 1999), we hypothesized that increasingly heavy body size would be associated with decreases in being nonverbally liked.

Television Shows

An informal survey was distributed to 34 female undergraduates in a lower-level psychology course at Tufts University (Medford, MA). This survey simply asked respondents to list their three favorite television shows. Survey responses were used to compile a list of television shows from which to sample female characters. We were particularly interested in *scripted* television shows because these include characters that recur over a period of years and because we wanted to avoid variability due to differences in show format; hence, we discarded references to reality shows, news programs, and movies, as well as broad references to television networks. A total of 46 shows were listed, of which 18 were scripted television shows that were listed by multiple respondents and that included recurring female characters (see Appendix). Ten of these 18 shows were among the 20 shows (current or syndicated) most popular among young adults. These shows thus constituted a representative sample of the scripted-show population.

Episodes and Characters

To approximate the amount of bias appearing on scripted television in a finite period, we recorded two episodes of each show in a 2-week period and subsequently digitized them. From this 2-week sample of 18 shows, a total of 76 female characters were included in the analysis, accounting for close to 100% of the population of female characters on these shows.

Selection of Clips

Research suggests that impressions derived from 10 s of non-verbal exposure are as accurate as those derived from much longer time periods (e.g., 5 min or more; Ambady & Rosenthal, 1992). As such, several 10-s clips were made for each character.[1] Our goal of four clips per character was secondary to a systematic and unbiased procedure for selecting clips. Clips were only selected if they included 10 s of uninterrupted social interaction, included both characters in a single frame for at least 1 s, and occurred in the first or last 10 min of an episode. In the event that multiple clips met these criteria, the first clip from each segment was always selected. There were 186 total clips.

Editing of Selected Clips

The 10-s clips for each character were digitally edited. Specifically, the primary character within each clip was digitally edited out of the scene with Adobe Premiere software (Adobe Systems, Inc., San Jose, CA) by eliminating those parts of the screen that included the character. This editing process ensured that the weight or appearance of the featured character did not influence ratings of nonverbal responses to that character. The audio track was also digitally removed from each clip to ensure that only nonverbal information was available to judges. These edited 10-s clips were organized into sets according to character; thus, there were 76 sets (one set per character).

Judges

Sixty-three undergraduate students were recruited via an advertisement on a university website or at a campus café. Of these, 17 women rated nonverbal liking on the basis of silent and edited television clips, 14 students (10 female) rated verbal liking on the basis of transcripts, 12 female students rated the body size of characters on the basis of still images, and 20 students (13 female) rated the character traits of known characters.

Nonverbal Liking Ratings

Rating procedure. To ensure that the featured characters were rated on the content of the clips rather than preexisting knowledge of the characters, we confirmed (via self-report) that judges "never" or "almost never" watched television. Groups of three to five judges rated each of 76 clip sets for "how much the visible characters liked or disliked the 'blocked' character." The clip sets were presented in a different random order for each group. Ratings were made on a -3 (*strongly disliked*) to $+3$ (*strongly liked*) scale. Even if judges had seen a show before, they would have difficulty identifying the blocked character unless those judges had seen the particular episode.

For any single character, we eliminated judges who had previously seen the relevant episode (on average, only 6.9%, or one judge, had seen each episode).

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[1] A 10-s sample of a television character year is equivalent to at least a 30-min sample of a "real person" year. Multiplying the episodes in a year (no more than 24) by the minutes in an episode (no more than 44) yields a maximum 1,056-min character year. Real people have an approximate minimum of 213,000 meaningful minutes (10 hr per day × 356 days). Ten seconds of television character behavior is, thus, proportionally equal to at least a half an hour of "real person" time and, hence, at least as representative as most measurements of human behavior.

Nonverbal liking scores. Inter-rater reliability was high for the "liking" item (Cronbach's $\alpha = .83$). We therefore averaged ratings for each character across judges to create "nonverbal liking" scores.

Body-Size Ratings

Character images. Still-frame images of each of the 76 female characters were taken from one of the two recorded episodes. For each character, the first still image that provided a frontal view of the entire body was selected. Individual judges rated each of 76 character bodies according to a figural rating scale (Stunkard, Sorensen, & Schulsinger, 1983). The scale included nine drawn body sizes ranging from 10 (*quite slim*) to 90 (*quite large*). In anticipation of a relatively restricted range (female television characters typically have quite slim proportions; see Tiggemann, 2002), we encouraged judges to use all integers between 10 and 90 (e.g., "27," "72"). Character images were presented in a random order on a computer monitor, through the use of MediaLab software (Empirisoft Corporation, New York, NY). The figural rating scale appeared underneath each character image.

Body-size scores. Inter-rater reliability was quite high (Cronbach's $\alpha = .94$). Consequently, body-size scores for each character were averaged across judges. Rated body size ranged from 23.17 to 68.13, mean body size was 35.51, and median body size was 32.58.

Nonverbal Bias Scores

To minimize the influence of any single show, we computed nonverbal bias scores for each show. These scores reflect—for each show—the degree to which slimmer female characters were liked (nonverbally) more than heavier female characters. To compute nonverbal bias, nonverbal liking and body-size scores were each standardized within the entire sample (by subtracting the mean and dividing by the standard deviation). Hence, heavier characters and nonverbally liked characters would have positive body-size scores and positive liking scores, respectively. For presentational purposes, the liking scores were reversed such that liked characters were indexed by negative scores. For each character, the resulting scores were then multiplied together. Positive scores indicated nonverbal bias in favor of a slim character or against a heavy character. For example, a liked slim character would have a positive nonverbal bias score, because her body-size score would be negative and her liking score would be negative. Similarly, a disliked and heavy character would also have a positive score. Conversely, liked heavy characters and disliked slim characters would have negative scores. Because nonverbal bias manifests itself as the relative difference in liking for slim versus heavy women, a single index of nonverbal bias was desirable.

For each show, nonverbal pro-slim bias scores of the characters were averaged. We considered the bias scores for each show to be reliable estimates because the sampled characters very nearly represented the population of steady female characters in each show.

Character Ratings

To control for relevant third-variable confounds, we asked a group of participant judges to rate several stable characteristics of the characters. To ensure that the featured characters were rated by knowledgeable judges, we confirmed (via self-report) that judges frequently viewed the shows in which the characters appeared. These judges individually rated each character for how kind, intelligent, and sociable that character was (on 0–6 scales anchored by *not at all* and *extremely*). Characters were identified by images (screen shots) accompanied by names. Inter-rater reliability was acceptable for each type of rating (αs = .93, .92, and .90 for kind, intelligent, and sociable, respectively). Consequently, ratings for each character were averaged across judges.

Transcript Ratings

To control for verbal bias (Fouts & Burgraff, 1999, 2000), participant judges rated transcripts according to the verbal content of the clips. In general, ratings of thinly sliced transcripts are as predictive as ratings of thinly sliced silent video clips (see Ambady & Rosenthal, 1992). As with nonverbal liking ratings, judges viewed all transcripts pertaining to a character and then rated this character (from $-3 = $ *extremely disliked* to $+3 = $ *extremely liked*). Inter-rater reliability was high for these ratings ($\alpha = .90$); consequently, verbal liking ratings for each character were averaged across judges.

Results

Are Slim Female Television Characters Nonverbally Favored?

A simple correlation was computed between body size and nonverbal liking. As expected, this correlation was negative and significant ($r = -.23$, $p = .04$), showing that slim female characters elicited more favorable nonverbal responses than did heavier female characters. This correlation was not reduced in controlling for character kindness ($r = -.25$), intelligence ($r = -.24$), sociability ($r = -.23$), or verbal liking ($r = -.30$; all ps < .05).

How Predominant Is Nonverbal Pro-Slim Bias?

Mean nonverbal bias was positive (pro-slim) in 61% of the shows. This same proportion was true when considering only primary characters and when considering median nonverbal bias. Given the entire sample and equal weighting for each show, mean nonverbal bias (a) was .20 (median = .16), (b) was associated with a 95% confidence interval of .03 to .37, and (c) was significantly greater than zero, $t(17) = 2.54$, $p = .02$, $r = .53$. Hence, young women are exposed to nonverbal pro-slim bias more often than they are exposed to nonverbal pro-heavy bias. Moreover, the nonverbal pro-heavy bias that young women are exposed to on scripted television appears to be quite weak, compared with nonverbal pro-slim bias. Among the seven shows that exhibited a pro-heavy bias, the mean nonverbal bias was $-.09$ (median = $-.07$). Among the 11 shows that exhibited a pro-slim bias, the mean nonverbal bias was .39 (median = .32). Pro-slim bias is thus about four times as strong as pro-heavy bias (.39:.09 for means; .32:.07 for medians).

Discussion

A subtle bias exists on television. Specifically, Study 1 showed that the nonverbal behavior of television characters toward women

depends on the body size of those women. To the extent that a female character was slim, she would be expected to receive positive nonverbal responses from other television characters. These findings are especially striking considering that they occurred within a population of female characters who were already quite slim. Thus, in a sample of 18 shows, including many of the most popular among young women, extremely (perhaps unhealthily) slim characters were nonverbally favored over somewhat slim characters.

This finding supports the view that implicit biases based on social categories are alive and well in Western culture (e.g., Hebl & Dovidio, 2005). Whereas previous research revealed the existence of such implicit, nonverbal biases in the laboratory (e.g., Dovidio et al., 1997), we find evidence for nonverbal bias in a cultural communication medium—popular television. The nonverbal behaviors of television characters reflected the body size of the women with whom they were interacting. Given that these television programs are watched by millions of viewers, it seems reasonable to conclude that people are frequently exposed to bias via nonverbal behavior. Nonverbal bias is therefore a part of Western culture in the sense that people in Western culture are frequently exposed to it.

Can exposure to nonverbal bias influence the beliefs and attitudes of people within a culture? If so, then the nonverbal slimness bias depicted on television and encountered by millions of people is likely to have a substantial impact on shared beliefs and attitudes about body size. In Study 2, we examined how exposure to nonverbal slimness bias might influence individual beliefs about body size.

Study 2

Given perceivers' propensity to (a) form impressions from nonverbal behaviors and (b) learn to associate social characteristics, it is possible that observing nonverbal behavior from afar could teach observers that, for example, slim women are well-liked. We hypothesized that exposure to nonverbal bias would cause participants to think that others like slim people. Just as exemplification theory (cf. Zillman, 2002) suggests that exposure to exemplars is likely to be especially influential, we expected that exposure to exemplars of nonverbal behavior would be especially influential with respect to the impact of others' attitudes. Because people come to hold the attitudes associated with others (e.g., Lowery, Hardin, & Sinclair, 2001), we expected that exposure to nonverbal bias would also cause perceivers to like slim women and want to be slim.

Conscious recognition of the nonverbal pattern should not be necessary for nonverbal bias to exert an impact. Previous implicit learning research (see Lewicki et al., 1992) has shown that conscious recognition of environmental covariation is not necessary for exposure to such covariation to exert an impact. Because the differences in character body size in the current study were relatively small (most female television characters fall in the slim-to-normal range) and because the depicted (nonverbal) behavior was quite subtle, we predicted that perceivers would be unable to identify the nonverbal bias pattern depicted in the clips. In summary, exposure to nonverbal slimness bias should exert a nonconscious influence on body ideals attributed to others and on one's own body ideals and attitudes.

Method

Overview and Hypotheses

Two sets of video clips were constructed from the Study 1 materials: One set included clips of characters with high positive (pro-slim) nonverbal bias scores and the other set included clips of characters with high negative (pro-heavy) nonverbal bias scores. These clip sets were carefully constructed so as to be equivalent on other characteristics, such as average body size. Female participants were randomly assigned to one of these two sets of clips and consequently answered questions about (a) their own ideal body, (b) the ideal body for "most people," and (c) their attitudes toward slim women.

Participants exposed to clips depicting nonverbal pro-slim bias were expected to (a) report especially slim body ideals, (b) attribute slim ideals to others, and (c) report especially positive evaluations of slim women.

Participants and Setting

Twenty-nine female undergraduates at a private university participated in exchange for partial course credit in a low-level psychology class. Participants were run in individual cubicles.

Materials

Video-clip sets. Two sets of silent (nonverbal) video clips were constructed from the clips used in Study 1. Unlike Study 1, however, the featured character was *not* cropped out of these clips. *Pro-heavy clips* were selected so as to include clips of 17 characters with the most negative nonverbal bias scores. In other words, these silent clips included relatively heavy characters treated poorly *and* relatively slim characters treated well. In contrast, *pro-slim clips* were selected so as to include clips of 17 characters with the most positive nonverbal bias scores. These silent clips included relatively slim characters treated poorly and relatively heavy characters treated well. Character body size was positively correlated with being nonverbally liked in the pro-heavy clips ($r = .53$, $p = .03$), whereas in the pro-slim clips, character body size was negatively correlated with being nonverbally liked ($r = -.88$, $p < .001$; $Z = 5.2$, $p < .001$). As intended, then, the two sets of clips differed with regard to whether slim or heavy female characters were nonverbally favored.

We also wanted to be certain that average body size was equivalent in the two groups of clips. The body-size ratings from Study 1 confirmed that characters in the pro-slim set (body-size $M = 35.88$) were not significantly larger or smaller than characters in the pro-heavy set (body-size $M = 34.16$), $t(32) = .41$, $p = .68$, $r = .07$. Hence, the pro-slim clips did not include slimmer women than the pro-heavy clips. Rather, the slim characters were treated better and the heavy characters were treated worse (nonverbally) in the pro-slim clips than in the pro-heavy clips. We also ensured that the characters did not differ with respect to other characteristics, such as apparent kindness, sociability, or intelligence. Independent groups t tests revealed that characters in the pro-slim set did not differ from characters in the pro-heavy set with respect to judged intelligence (both Ms = 4.79), kindness (pro-slim $M = 4.41$; pro-heavy $M = 4.58$), or sociability (pro-slim $M = 5.03$; pro-heavy $M = 4.99$), ts(32) < .5, ps > .6. Finally, we equated the two

groups with respect to race—in each set there were twelve White women, three Hispanic women, two Black women, and one Asian woman. Thus, the two sets of clips did differ with respect to nonverbal slimness bias but did not differ with respect to body size, ethnicity, character intelligence, character kindness, or character sociability.

We conducted two pilot studies to examine the extent to which perceivers could consciously recognize the pattern of nonverbal bias. In the first pilot study, 20 female undergraduates were told that they would receive $20 if they could uncover the hidden pattern during or after watching the clips. Even after the provision of several hints, these undergraduates could not identify the pattern. In the second pilot study, 26 participants were told prior to viewing the clips that the pattern was one of four options (including the correct option). Nonetheless, when given a four-item multiple choice after watching the clips, participants could not identify the pattern at above-chance (25%) rates.[2] In summary, perceivers were unable to consciously identify—in the clips used here—the relationship between nonverbal behavior and body size.

Cultural body ideal. In the main study, participants completed a two-item measure of cultural body ideals after viewing the clips. Participants were asked to indicate, on the figural rating scale used in Study 1 (Stunkard et al., 1983), the (a) body size that most women would like to be and (b) body size that most men want in a woman. Responses to these two items were consistent ($r = .45$, $p = .01$) and were averaged to form an index of the participant's cultural body ideal.

Individual body ideal. Participants were asked to indicate, on the figural rating scale used in Study 1, the body size that they would most like to be. This single item has been used in many studies to index body ideals (see Thompson & van den Berg, 2002).

Attitudes toward slim women. We created an index of attitudes toward slim women by using the three relevant items from the Ideal Body Stereotype Scale—Revised (Stice, 2001). The convergent and predictive validity of the overall scale have been demonstrated, as has acceptable test–retest reliability (Stice & Agras, 1998). The three relevant items are "slender women are more attractive," "women who are in shape are more attractive," and "women with toned (lean) bodies are more attractive," with agreement in all three cases rated on a 1 (*disagree*) to 5 (*agree*) scale. Responses to these items were highly consistent ($\alpha = .87$) and were averaged to form a single index.

Procedure

On arrival, participants were informed that they would be completing several short but unrelated studies. After completing informed consent, participants followed instructions that appeared on a computer monitor. As part of these instructions, participants were informed that the first study was about making judgments of television characters. They then viewed the clips to which they had been randomly assigned (pro-slim or pro-heavy). These clips were presented via MediaLab software. Although all clips featuring a particular character were grouped together, the characters were presented in a different random order for each participant. For each character viewing, participants rated the extent to which the character was liked. At the conclusion of this study, participants completed the three self-report measures described above. During

debriefing, no participants reported any knowledge that the two studies were related, and most were quite surprised at this revelation.

Results

Recall that the characters in the two sets did not differ in their average size. Rather, in the pro-slim clips, slim characters elicited more positive nonverbal behavior than did heavier characters. In the pro-heavy clips, heavy characters elicited more positive nonverbal behavior than did slimmer characters.

Manipulation Check

To ensure that the clips were evaluated in the intended manner, we analyzed participants' liking ratings. First, participants within each condition agreed about the extent to which each character was liked: Within the pro-heavy condition, inter-rater $\alpha = .92$, and within the pro-slim condition inter-rater $\alpha = .89$. We then computed an average score for each character, reflecting the degree to which the character was nonverbally liked by the other characters. Finally, and as in Study 1, we correlated these nonverbal liking ratings with body size. The correlation within the pro-slim condition was significantly more negative (indicating greater pro-slim bias; $r = -.74$, $p < .001$) than the correlation within the pro-heavy condition ($r = .08$, $p = .76$; $Z = 2.72$, $p = .006$). The pro-slim condition included significantly more nonverbal pro-slim bias than did the pro-heavy condition.[3]

Cultural Body Ideal

We expected that exposure to nonverbal bias would influence the beliefs that people attribute to others. Indeed, pro-slim condition participants had significantly slimmer cultural body ideals ($M = 27.67$) than did pro-heavy condition participants ($M = 32.64$), $t(27) = 2.05$, $p = .05$, $r = .37$. Thus, nonverbal bias can influence the beliefs attributed to others.

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[2] In the first pilot study, 20 undergraduate female participants were shown one of the two sets of clips after receiving "pattern-recognition" instructions. Participants were told that there was a systematic pattern in the clips that involved "nonverbal liking" (which was defined) and another variable. They were promised $20 if they could identify the pattern, yet none were able to do so.

The second pilot study used a multiple-choice format while removing the monetary incentive. Twenty-six female undergraduates were instructed to identify a pattern in a set of video clips—this pattern was said to include nonverbal liking (which was defined) and "another variable." They were told ahead of time that the "other variable" was (a) race, (b) clothing, (c) body size, or (d) age. After watching the clips, participants were asked to select the other variable from the list of four possibilities (race, clothing, body size, or age). Fifteen percent of participants in the pro-slim condition selected body size as did 15% within the pro-heavy condition—this rate was below chance (where chance was 25%). Moreover, there were no differences in answer choices based on the clips viewed (i.e., pro-heavy or pro-slim).

[3] An anti-fat bias may have led participants to be unwilling or unable to perceive a nonverbal "pro-heavy" bias (Crandall, 1994). Clearly, this would not have been an issue in Study 1, in which judges could not see the featured actresses or their body size.

Individual Body Ideal

We expected that exposure to nonverbal bias would influence individual desires and attitudes. Indeed, pro-slim condition participants had significantly slimmer body ideals ($M = 28.80$) than pro-heavy condition participants ($M = 34.07$), $t(27) = 2.07$, $p = .05$, $r = .37$, suggesting that nonverbal bias influences individual desires.

We had hypothesized that the effects of nonverbal bias on individual body ideals would be mediated by cultural body ideals. To examine this hypothesis, we conducted mediational analyses based on established guidelines (Baron & Kenny, 1986). A dummy-coded video condition variable (*pro-heavy* = 0) predicted both individual body ideal ($\beta = -.37$, $p = .05$) and cultural body ideal ($\beta = -.37$, $p = .05$)—body ideals were slimmer among participants exposed to pro-slim bias. When the dummy-coded variable and cultural body-ideal scores were entered together to predict individual body ideals, cultural body-ideal scores were a significant predictor ($\beta = .73$, $p < .001$). More important, and consistent with mediation, the predictive power of the dummy-coded video condition variable dropped to $\beta = -.10$, $p = .44$ (see Figure 1). A Sobel test conducted on the indirect effect was significant ($Z = -1.91$, $p = .05$). In summary, the influence of nonverbal bias on individual desires was mediated by beliefs attributed to others (cultural ideals).

Attitudes Toward Slim Women

We expected participants who had viewed the pro-slim videos to have more positive attitudes toward slim bodies than participants who had viewed the pro-heavy videos. Indeed, pro-slim condition

participants had significantly more positive attitudes toward slim bodies ($M = 4.48$) than pro-heavy condition participants ($M = 3.88$), $t(27) = 2.21$, $p = .04$, $r = .39$. Thus, nonverbal bias can influence individual attitudes.

As with body ideals, we expected nonverbal bias to influence attitudes via its effects on the beliefs attributed to others. Specifically, we expected the effects of nonverbal bias on attitudes toward slim women to be mediated by cultural body ideals. Indeed, the dummy-coded video condition variable (*pro-heavy* = 0) predicted both attitudes toward slim women ($\beta = .39$, $p = .04$) and cultural body ideal ($\beta = -.37$, $p = .05$). When the dummy-coded variable and cultural body-ideal scores were entered together to predict attitudes toward slim women, cultural body-ideal scores were a significant predictor ($\beta = -.65$, $p < .001$). Consistent with mediation, the predictive power of the dummy-coded video condition variable dropped to $\beta = .15$, $p = .3$ (see Figure 1; Sobel $Z = 1.85$, $p = .065$). In summary, the influence of nonverbal bias on individual attitudes was mediated by beliefs attributed to others (cultural ideals).

Discussion

Exposure to nonverbal bias in favor of especially slim women caused increases in young females' beliefs that most people like especially slim female bodies. As a consequence, exposure to nonverbal bias (favoring slim women) led young women (a) to view slim female bodies as especially attractive and (b) to desire a slimmer body size. Participants' beliefs about others' body ideals (i.e., cultural body ideals) mediated the effects of nonverbal bias on body-related attitudes and desires. Hence, exposure to nonverbal bias influenced attitudes and desires by influencing cultural ideals.

These rather strong effects occurred despite the fact that the clips contained nonverbal bias that was inaccessible to conscious awareness. The causal influence of nonverbal bias may thus be described as a particularly subtle form of social influence. Finally, it is noteworthy that the two sets of clips differed on whether slim or heavy characters were nonverbally favored but did not differ with respect to average body size and several other variables.

Study 3

The results of Studies 1 and 2 suggest that people are naturally exposed to and influenced by nonverbal bias. In building on these findings, it seemed reasonable to hypothesize that natural exposure to nonverbal bias accounted for individual differences in bias-related attitudes and beliefs. Indeed, research on cultivation theory has demonstrated that aggregate messages embedded across a broad array of television shows can account for beliefs held by television viewers. For example, violence is over-represented and the elderly are under-represented on television, compared with the real world. Indeed, increased television viewing is associated with increases in estimates of violence and decreases in estimates of the elderly population (e.g., Gerbner, Gross, Morgan, & Signorelli, 1980; Gerbner, Gross, Signorelli, & Morgan, 1980). The purpose of Study 3 was to examine whether natural exposure to televised nonverbal bias was sufficient for accounting for bias-related attitudes, beliefs, and behavior.
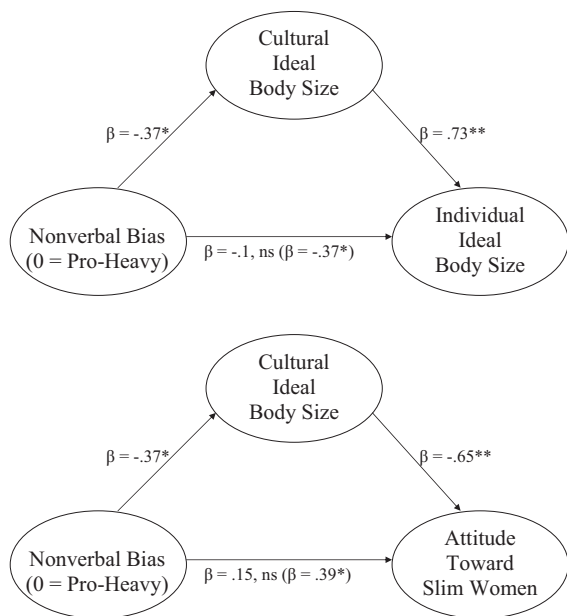

Figure 1. Mediation of individual ideals and attitudes toward slim women. Top panel indicates mediation of individual ideals, whereas bottom panel indicates mediation of attitudes toward slim women. Parenthetical numbers indicate beta weights without cultural ideals included in the model. * $p < .05$. ** $p < .001$.

Because Study 3 was not a true experiment, we took steps to examine the viability of several third-variable and reverse-causality explanations. With respect to third variables, we controlled for simple effects of body size, verbal pro-slim bias, and several other meaningful nonverbal biases. Finally, we conducted a pilot study to assess the viability of reverse causality, or the idea that endorsement of a slim ideal predisposes viewers to choose to watch nonverbally biased programs.

Method

Overview and Hypotheses

Female participants indicated the three scripted television shows that they watched most often and subsequently completed several established self-report measures. These measures assessed ideal body size, attitudes toward slim women, attitudes toward heavy people, fear of gaining weight, and dietary restraint. For each participant, the nonverbal bias score associated with each listed show was used to compute that participant's exposure-to-nonverbal-bias score.

We expected exposure to pro-slim nonverbal bias to be negatively correlated with ideal body size but positively correlated with positive attitudes toward slim women, dislike for heavy people, fear of gaining weight, and dietary restraint. We expected these effects to hold, even after controlling for several third variables.

Participants

In Study 2, about 10 min of exposure to nonverbal bias changed body-related attitudes and desires, with an effect size of about $r = .38$. We estimated the effects of repeated exposure (over a lifetime, perhaps dozens of hours of exposure) to be larger, approximately $r = .5$. This estimate is further supported by the fact that relationships depicted in the media as exemplars (e.g., individual television clips or stories in newspapers) can exert a social influence that increases with time (Gibson & Zillmann, 1994; see also, Zillmann, 2002). With this expected effect size and an alpha set to .05, power of .75 could be reached with a sample size of 29. Consequently, we recruited 29 female undergraduates to participate in exchange for partial course credit or $10. Participants completed the procedure on a computer in individual cubicles.

Materials

Nonverbal bias. Participants typed the names of the three scripted television shows they watched most often. We chose an open-response format to maximize the likelihood that the listed shows were frequently viewed (and not just selected because they appeared on a list). Participants listed an average of two shows contained in our nonverbal bias database. The nonverbal pro-slim bias score for each participant was computed by averaging the nonverbal bias scores associated with their listed shows (see Study 1 for computation of nonverbal bias scores).

Other biases. In Study 1, each target character was assigned intelligence, kindness, sociability, and "verbally liked" ratings by several groups of judges. In Study 3, these ratings were used to create bias scores for each character and show, just as nonverbal liking ratings were used to create nonverbal bias ratings for each score and show (see Study 1 for computation). For example, we

multiplied standardized intelligence scores with standardized nonverbal liking scores to form pro-intelligent nonverbal bias scores for each character. Consequently, pro-intelligent nonverbal bias, pro-kind nonverbal bias, pro-sociable nonverbal bias, and pro-slim verbal bias scores were computed for each Study 3 participant by averaging the relevant bias scores associated with their listed shows.

Individual body ideal. Same as Study 2.

Attitudes toward slim women. Same as Study 2.

Attitudes toward heavy women. We used the Anti-Fat Attitudes scale (Crandall, 1994) to examine the degree to which exposure to nonverbal bias was associated with prejudice against heavy people. This scale consists of a total of 13 agreement items, each answered on a 9-point scale. The Anti-Fat Attitudes scale has three subscales: (a) dislike for fat people, (b) fear of becoming fat, and (c) beliefs that people become fat because of a lack of willpower. We averaged scores for items within each subscale to form an overall index for each subscale.

Dietary restraint. Because nonverbal bias was expected to influence body-related beliefs and attitudes, and because body-related beliefs and attitudes are an important predictor of eating behavior (e.g., Polivy & Herman, 2002; Thompson & Stice, 2001), we expected that exposure to nonverbal bias would be related to dietary restraint (characterized by a concern for dieting and weight fluctuation; Heatherton, Herman, Polivy, King, & McGree, 1988). We measured dietary restraint with the frequently utilized revised (10-item) restraint scale ($\alpha = .78$ here). Although there is some debate about the validity of this scale, there is evidence that this scale possesses multiple markers of validity (see Heatherton et al., 1988); we chose to use this scale primarily to keep with existing research. Examples of scale items include "how often are you dieting?" and "in a typical week how much does your weight fluctuate?" The response choices differ by item, but numeric choices range from 1 to 5, with 5 indexing greatest restraint.

Procedure

Participants arrived at the laboratory individually and were assigned a cubicle. After completing informed consent, participants listed their three favorite television shows, and completed the individual ideal, attitudes toward slim women, Anti-Fat Attitudes, and restraint scales in order. Participants were then debriefed and dismissed.

Results

As in Study 1, positive nonverbal bias scores were consistent with favoritism for relatively slim women.

Exposure to Nonverbal Pro-Slim Bias and Attitudes About Body Size

As expected, increases in exposure to nonverbal bias were associated with reduced ideal body size ($r = -.62$, $p < .001$), positive attitudes toward slim women ($r = .45$, $p = .01$), dislike for fat people ($r = .54$, $p = .002$), increased fears of becoming fat ($r = .49$, $p < .01$), and increased beliefs that fat people lack willpower ($r = .39$, $p < .05$). Increased exposure to nonverbal bias

was nonsignificantly associated with restrained eating scores ($r = .30$, $p = .11$).

Controlling for Potential Third Variables

In three sets of equations, we controlled for exposure to (a) simple body size, (b) verbal pro-slim bias, and (c) nonverbal biases (pro-kind, pro-smart, and pro-sociable). Three equations were preferable to one because of multicollinearity concerns. For each set, we computed partial correlations between exposure to nonverbal pro-slim bias and the outcome variables.

Body size. After controlling for exposure to slim female body sizes, exposure to nonverbal pro-slim bias remained a significant ($p < .05$) associate of slim body ideals ($pr = -.59$), positive attitudes toward slim women ($pr = .43$), dislike for fat people ($pr = .51$), fear of becoming fat ($pr = .49$), and the belief that fat people lack willpower ($pr = .39$). The previously nonsignificant relationship with restrained eating remained marginal ($pr = .33$; $p = .08$).

Verbal bias. After controlling for exposure to verbal pro-slim bias, exposure to nonverbal pro-slim bias remained a significant ($p < .05$) associate of slim body ideals ($pr = -.40$), positive attitudes toward slim women ($pr = .42$), dislike for fat people ($pr = .39$), and fear of becoming fat ($pr = .40$). Although the relationship with attributions of willpower became nonsignificant ($pr = .24$; $p = .22$), the previously nonsignificant relationship with restrained eating became significant ($pr = .42$; $p = .03$).

Nonverbal biases. After controlling for exposure to other nonverbal biases (pro-smart, pro-kind, pro-sociable), exposure to nonverbal pro-slim bias remained a significant ($p \leq .05$) associate of slim body ideals ($pr = -.38$), dislike for fat people ($pr = .58$), fear of becoming fat ($pr = .45$), and the belief that fat people lack willpower ($pr = .42$). Although the relationship with attitudes toward slim women became nonsignificant ($pr = .24$; $p = .2$), the previously nonsignificant relationship with restrained eating became significant ($pr = .51$; $p < .01$).

In general, exposure to nonverbal pro-slim bias appears to account for individual differences in body ideals and attitudes in a manner that is independent of simple effects of body size, verbal pro-slim bias, and several other nonverbal biases.

Reverse-Causality Pilot Study

As applied to Study 3, reverse causality is the idea that having pro-slim attitudes and ideals predisposes viewers to watch shows depicting pro-slim nonverbal bias. One reason to doubt reverse causality here is that participants in Study 3 listed their three most frequently watched shows—these are shows for which participants watched an initial episode and subsequently decided to watch more. Still, it is possible that personally biased individuals continue to watch nonverbally biased shows for less-than-conscious reasons. That is, after viewing an episode, biased individuals may decide to watch more episodes of nonverbally biased shows.

To address this possibility, we recruited (via a campus website) a sample of 26 female participants with little if any exposure to the 18 sampled shows. These participants first completed the outcome measures used in Study 3 and later watched a half episode of each of the 18 shows. To maintain consistency with the other studies, the chosen episode for each show was the first of the two episodes

used in Study 1 to estimate nonverbal bias. After each half episode, participants rated (on 7-point scales) the extent to which they (a) would like to watch the second half of the episode, (b) would watch the show in the future, and (c) liked the show in general—within each show, responses to these questions were averaged to form "show-liking" scores ($\alpha = .95$). At the end of the session, participants also ranked these shows in order of how much they liked each. Rankings were highly and inversely correlated with the show-liking index (average and median $r = -.77$ and $-.83$, respectively)—to maintain consistency with Study 3, the nonverbal bias scores of each participant's three top-ranked shows were used to create an index of "preference for shows with nonverbal bias." There was no relationship between preferences for nonverbally pro-slim shows and individual body ideal ($r = .03$), pro-slim attitudes ($r = .09$), anti-fat attitudes ($r = .03$), fear of becoming fat ($r = .24$), or weight control ($r = .04$). The findings of this pilot study do not support the idea that women with pro-slim biases continue to watch shows that depict a nonverbal pro-slim bias.

Discussion

Exposure to nonverbal bias on television occurs within a naturalistic context in which many factors surely influence body-related attitudes, beliefs, and behavior. Nonetheless, the results of Study 3 demonstrate that natural exposure to nonverbal bias accounts for substantial variance in (a) desired body size, (b) attitudes toward slim women, (c) prejudice against fat people, and (d) fear of becoming fat. Although the relationship with weight control ("restrained eating") was not significant, with a larger sample, this relationship may have been significant. Indeed, after controlling for relevant variables, nonverbal bias exposure was significantly related to weight control. There was no support for the tested third-variable or reverse-causality explanations of these findings.

Having demonstrated (a) that people are exposed to nonverbal bias (Study 1), (b) that people are influenced by exposure to nonverbal bias (Study 2), and (c) that exposure to nonverbal bias accounts for individual differences in beliefs and behavior (Study 3), we turned our attention to examining whether exposure to nonverbal bias accounts for regional differences in behavior.

Study 4

The established prevalence and influence of nonverbal bias implies that the impact of nonverbal bias is widespread. To more properly assess the role of nonverbal bias in building culture, we assessed the power of nonverbal bias on a broader stage. We conducted an archival study to examine the degree to which exposure to nonverbal bias accounted for regional differences in dieting behavior.

Apart from cultural differences, social psychologists have largely ignored regional differences (with a few exceptions; e.g., Nisbett & Cohen, 1996). Consider America. People in different American regions exhibit different behaviors; even people in neighboring towns are likely to exhibit some subtle behavioral differences (see Eaton et al., 2006). This is true for many forms of behavior, including unhealthy dietary behavior. For example, compared with teenage girls in other American cities, teenage girls in San Diego are especially likely to vomit in an effort to lose weight (see Eaton et al., 2006).

Although some might dismiss such regional differences as entirely due to measurement error, it is at least as likely that something more than measurement error is at work. Although regional factors such as warm climate, wealth, and racial diversity may account for regional differences in dieting behavior, we also expect regional exposure to nonverbal bias to play a role. We tested the hypothesis that regional differences in exposure to nonverbal bias account for regional differences in unhealthy dieting behaviors.

Method

Overview and Hypotheses

To examine the regional relationship between exposure to nonverbal bias and unhealthy dieting behaviors, we obtained regional television ratings from Nielsen and regional dieting behavior data from the Centers for Disease Control (CDC). Television-rating and dieting-behavior data were restricted to the adolescent female population. Televised exposure to nonverbal bias was calculated for each region.

We expected regional exposure to nonverbal bias to be positively correlated with subsequent unhealthy dieting behavior, even after controlling for relevant third variables.

Television Ratings

Nielsen monitors thousands of television programs in a total of 256 American viewing areas. *Set meters* are devices connected to the television that simply record the channel viewed; *people meters* also collect information about who is viewing the channel; *diaries* are self-report instruments sent to homes during sweeps periods. Regions that included people meters were selected for the demographic metric of young women aged 12–24 years. In these 56 markets, ratings were made available for 12 shows with nonverbal bias scores.

Nielsen data collection is most intense and reliable for the "sweeps" periods (February, May, June, November); the purchased data allowed for the computation of an average sweeps rating for each of the 12 shows within each region for the 2005 season. For purposes of standardization, we focused on Nielsen ratings for the percentage of viewers in each region.

Unhealthy Dietary Behaviors

As part of the "Healthy Youth!" initiative, the CDC distribute a "Youth Risk Behavior Surveillance" survey to a variety of high school administrators across the country. The survey items demonstrate high 2-week test–retest reliability (Brener, Collins, Kann, Warren, & Williams, 1995; Brener et al., 2002) and items relevant to eating behavior (self-reported weight) are closely related to objective measures (Brener, McManus, Galuska, Lowry, & Wechsler, 2003). Of the randomly selected schools, 72–100% participated (depending on state/locality), and within these schools, 61–93% of students participated. Sample sizes ranged from 942 to 9,708, and all but one region had at least 1,000 respondents.

Surveys were administered to students during a single class period in late 2005. Anonymity and confidentiality were emphasized. The three (yes/no) questions of interest were (a) "Over the last 30 days, did you go without eating for 24 hours or more (also called fasting) to lose weight or keep from gaining weight?" (b) "Over the last 30 days, did you take any diet pills, powders, or liquids without a doctor's advice to lose weight or keep from gaining weight? (do not include meal replacement products such as Slim-Fast)" (c) "Over the last 30 days, did you vomit or take laxatives to lose weight or to keep from gaining weight?"

For each region (state or locality), the percentage of female students responding "yes" to these questions was calculated—these percentages are regarded here as "regional prevalence rates." An unhealthy diet index was created by averaging regional prevalence rates for these three questions ($\alpha = .52$). The relatively low reliability of this index led us to consider dropping one of the three questions. Reliability was substantially increased (to $\alpha = .69$) by dropping the fasting question. We focused on this more reliable index of unhealthy dieting.

Selection of Regions for Data Analysis

Nielsen regions are not defined by state or local boundaries but are, instead, defined by metropolitan regions and population. In contrast, all of the CDC regions were defined by state or local boundaries. Our analyses were focused on regions clearly common to both instruments. A total of 22 regions were retained for analysis (see Appendix).

Exposure to Nonverbal Bias Estimates

For each region, exposure to nonverbal bias was calculated by multiplying the rating of each show by its corresponding nonverbal bias score (obtained in Study 1). We then added these scores together for the region to produce the overall "exposure to nonverbal bias" score. Increasingly high scores on this variable index exposure to increasing "pro-slim" bias. For example, if a region had high television ratings for especially pro-slim shows, that region would have a high "exposure" score (especially if that region had low ratings for pro-heavy shows).

Controlling for Third Variables

Although the primary analysis was a simple correlation (see below), we conducted a secondary analysis to control for the prevalence of overweight, the prevalence of high-frequency television viewers, and the prevalence of African American respondents. Controlling for the prevalence of overweight women limits the likelihood that relationships with nonverbal bias are simply due to regional differences in body size. Controlling for high-frequency television viewers limits the likelihood that any effects of nonverbal bias are simply due to regional differences in television-viewing frequency. Finally, meta-analytic research (Grabe & Hyde, 2000) has shown that African American women are much less likely to exhibit restrictive and unhealthy dieting behavior. Controlling for the prevalence of African American respondents limits the likelihood that any effects of nonverbal bias are simply due to regional racial differences. These variables were obtained from the CDC dataset.

Results

Exposure to nonverbal bias was correlated with unhealthy dieting behavior ($r = .43$, $p = .05$). A partial correlation analysis revealed that this relationship held, even after controlling for the

prevalence of heavyweight women, the prevalence of high frequency television viewers, and the prevalence of African American respondents ($pr = .47$, $p < .05$).

Reverse Causality

Although we controlled for regional overweight, it is still possible that unhealthy regional dieting is an antecedent (rather than consequence) of regional viewing tendencies. To examine whether unhealthy regional eating habits were antecedent to regional viewing of our nonverbally biased shows, we tested the extent to which unhealthy regional eating habits in 1997 predicted regional television ratings in 2005. We chose 1997, as this was the last available year prior to the airing of the 12 sampled shows. Regional eating data was available for 16 of the 22 regions in the 1997 version of the Study 4 survey ("Healthy Youth!"). The relationship between unhealthy eating habits (taking diet pills, powders, or liquids) and 2005 ratings of the shows was small and negative ($r = -.06$, $p > .8$). Figure 2 illustrates the uniformity of this (null) relationship in a scatterplot, which can be compared with the scatterplot for the main analyses of Study 4. These findings, together with the "reverse-causality" pilot study for Study 3, suggest that preexisting attitudes and dietary habits may be poor predictors of consequent television viewing habits.

Discussion

In traveling from one region to another, one might notice that "locals" in one region behave differently from those in another region. We have proposed that these differences may be due, in part, to differences in exposure to nonverbal bias. Indeed, over 16% of regional differences in unhealthy dieting habits were accounted for by exposure to nonverbal bias on television.

The regional analysis approach is novel to some areas of psychology, so a brief discussion of this and alternative methodologies is warranted. Regional analysis is especially appropriate for illustrating how the natural diffusion of information—even subtle information—broadly accounts for behavior and, hence, cultural transmission. When regional samples share common channels of information diffusion (e.g., a variety of television programs) but differ in their use of those channels, it is possible to examine the impact of specific types of information (here, nonverbal information) on the broader culture.

We took an archival approach here because of the known veracity of the data sets. In considering such an approach, it seemed important to use established and well-validated data. Both Nielsen and the CDC use sophisticated probability sampling procedures, producing a large and representative sample within each region. As noted in the Methods section, it was possible to make sure that the Nielsen and CDC regions we used were highly commensurate. And because the Nielsen data are behavioral and do not rely on participants' recall for television shows, these data seemed superior to asking people from various regions to recall their exact viewing habits.

Of course correlational studies always allow for alternative causal explanations, including reverse causality. For example, it is possible that some regional characteristic, such as the body weight of people in the region, causes people both to watch nonverbally biased television shows and to try to lose weight in an unhealthy

manner. And although the results of Study 3 do not support reverse causality, it is possible that regional unhealthy weight-loss tactics cause a preference for shows nonverbally favoring slim women. Hence, it is important to note that Study 4 examined these alternative explanations—the role of exposure to nonverbal bias in regional unhealthy dieting was not simply due to racial differences, to the regional predominance of overweight women, African Americans, or high frequency television viewers. Moreover, a small pilot study found no support for the idea that unhealthy regional dietary habits are antecedent to watching (the sampled) shows containing nonverbal pro-slim bias. In summary, the results of Study 4 demonstrated that regional exposure to nonverbal pro-slim bias accounted, in part, for unhealthy regional dieting habits.

General Discussion

A considerable amount of communication occurs nonverbally (Mehrabian, 1972). Nonetheless, little is known about how nonverbal communication contributes to culturally shared attitudes and beliefs. The studies presented here are a first step in examining how nonverbal communication might socialize people to particular ways of thinking.

Study 1 demonstrated that characters on television shows popular among young women direct more positive nonverbal behavior toward slim (versus heavier) women. Study 2 showed that exposure to such bias can have a moderate to strong causal impact on the body ideals that women hold for themselves and that they think others hold. Studies 3 and 4 demonstrated that individual and regional differences in televised exposure to nonverbal bias could account for individual and regional differences in a variety of body-relevant beliefs, attitudes, and behaviors. Together, then, these four studies show that (a) millions of young women are regularly exposed to nonverbal bias; (b) this nonverbal bias can cause young women to have especially slim body ideals and to attribute such ideals to others; (c) nonverbal bias can account for substantial variance in young women's body-related beliefs, attitudes, and behavior; and (d) widespread exposure to nonverbal bias can partially account for regional trends in unhealthy dieting behavior. For these reasons, we argue that nonverbal bias—at least with regard to one type of social characteristic—is likely to play an important role in the formation of culturally shared beliefs, attitudes, and behavior.

Implications for Nonverbal Communication

A great deal of research has shown that nonverbal behavior has a strong communicative function. People use their own nonverbal behavior to alter the meaning of verbal communication and to directly communicate feelings, intentions, and thought processes. Conversely, perceivers can efficiently pick up on psychological processes (emotions, intentions) as well stable psychological characteristics (e.g., personality) from others' nonverbal behavior (Ambady et al., 2000; Bar et al., 2006; Weisbuch & Ambady, in press). Given the well-documented communicative properties of nonverbal behavior, it is surprising that the current studies are some of the first to examine how nonverbal communication contributes to the creation of shared norms and ideals. However, the current research can be integrated with related literatures to form
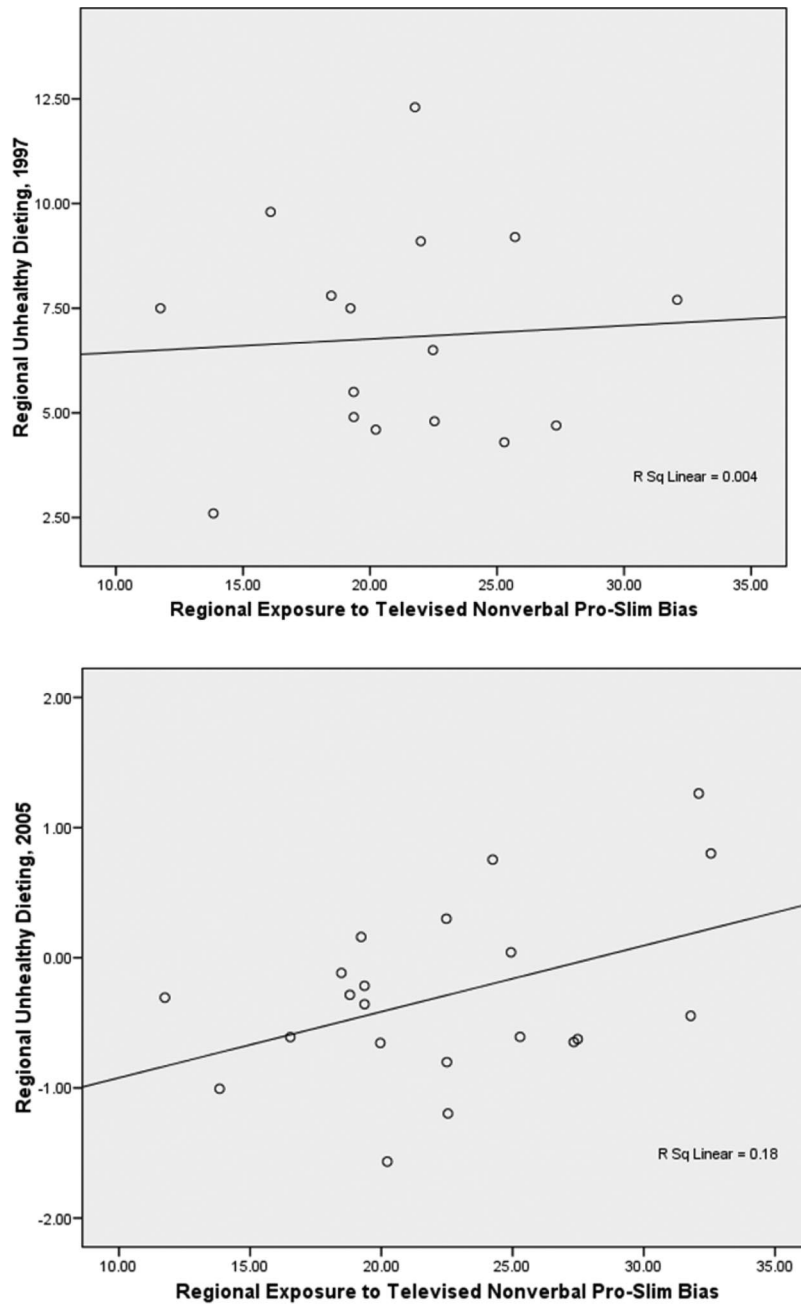
Figure 2. Scatterplots of 2005 regional exposure to nonverbal pro-slim bias as associated with unhealthy regional eating behaviors. In the top panel, unhealthy regional eating behaviors were measured in 1997. For the bottom panel, unhealthy regional eating behaviors were measured in late 2005. For both panels, exposure to nonverbal pro-slim bias contributes the *x* coordinate and unhealthy dieting score contributes the *y* coordinate.

the basis for future investigations into the role of nonverbal communication in building beliefs.

First, the term *contagion* has been used by various scholars to describe a sociological mechanism not unlike the process underlying the spread of disease. Contagion occurs when some psychological or physical state is passed from one person to another, despite little or no intention of one person to "infect" another. With

regard to nonverbal contagion, emotions are the most studied "disease" but nonverbal communication has been theorized to play a role in the passing of psychological states as abstract as time perception (e.g., Conway, 2004; Hatfield, Cacioppo, & Rapson, 1993). In the current research, nonverbally communicated attitudes were spread among young female television viewers in a contagion-like fashion. We speculate that this contagion was

largely unintentional on both ends (sender and receiver), but future research is needed to clarify the intentionality of processes contributing to nonverbal social influence.

A second literature with close ties to the current research is that of implicit learning. In implicit learning studies, participants are exposed to stimuli that contain hidden patterns—patterns which most participants are unable to consciously identify (Lewicki et al., 1992). Despite participants' inability to verbally describe these patterns, they are nonetheless influenced. In the current research, participants learned to associate liking with a particular body type (Study 2). Yet participants—even those with a monetary incentive—were unable to identify the relationship between body size and nonverbal liking. This is some of the first research connecting nonverbal communication to implicit learning—we hope that the current findings help to motivate similar research in the future.

Implications for Sociocultural Theories

The focus of this investigation was on young female participants. We chose this particular population because it is especially susceptible to pro-slim messages and is at special risk for slimness-related body-image issues and unhealthy dieting. Hence, although exposure to pro-slim bias should also influence men's attitudes about slim and heavy people, we would not expect men's body ideals or dieting behaviors to be influenced. The findings regarding women are, in many ways, consistent with sociocultural theories of body image and eating disorders. For example, media bias is an important element of many sociocultural theories (e.g., Levine & Smolak, 1996), and Study 1 illustrated yet another media bias in which slim women are favored. The Study 2 findings suggest that media bias favoring slim women can influence cultural and individual body ideals, consistent with sociocultural theories. Finally, the Study 3 and Study 4 findings suggest that exposure to such bias can account for between 10% and 20% of the variance in attitudes toward slim women, fear of becoming fat, and unhealthy dieting behaviors.

The current research also makes a unique contribution to the literature on body image in that the bias investigated here was extremely subtle: Naïve viewers were unable to consciously identify the nonverbal bias pattern. Moreover, the current research may add to social-cultural theorizing in providing a reason for why exposure to thin bodies is detrimental to body image. Viewers may infer that the presence of slim women on television indicates that society values these body sizes.

Issues of Causality in Studies 3 and 4

It is possible that unobserved mechanisms contributed to some of the findings described herein. Some unmeasured variable may help to explain why natural exposure to nonverbal bias is related to body ideals and dieting behavior (Studies 3 and 4). In anticipation of this possibility, we controlled for those third variables that seemed to be the most likely confounds, including verbal bias, alternative nonverbal biases (for intelligence, kindness, sociability), simple effects of body size, and ethnicity. Yet it is rarely (if ever) possible to control for all possible third variables, even in experiments. And despite the fact that several pilot studies failed to support the idea that body ideals and dieting behavior cause exposure to nonverbal bias (i.e., reverse causality), this idea cannot be ruled out entirely. Thus, although the current data are not supportive of third-variable and reverse-causality

explanations, it would be premature to make causal conclusions from Studies 3 and 4.

It is worth revisiting Study 4, especially in light of the relatively novel archival approach. We believe that this approach is promising with respect to gaining an understanding of the impact of social-psychological phenomena more typically examined in laboratory environments. Researchers can empirically analyze particular shows or people (news anchors, fictional characters, reality characters) with respect to the phenomenon of interest. Exposure to these shows or people can then be used as a predictor variable to examine the extent to which the phenomenon of interest is related to important outcome variables in viewers. When experimental data are consistent with these (typically) archival data, powerful models can emerge for illustrating the role of basic social-cognitive phenomena in prevalent behavior. Yet there are limitations to this approach, including the approach taken in the current Study 4. Perhaps most important, it is typically not possible to make causal conclusions from archival data. The best that can be done is to control for as many reasonable third variables as possible and to examine the type of longitudinal data that renders reverse causality impossible. An additional issue is that although we used two data sources (Nielsen and the CDC), it is preferable to use a single data source when possible. Multiple data sources introduce a great deal of "noise" into the data and are likely to reduce power. Yet it is often the case that the most interesting questions require data from separate sources. In such cases, it seems reasonable to conduct the archival study but to acknowledge the "noisiness" of the data.

Conclusion

The importance of nonverbal behavior in building human culture has been largely ignored. Here we found support for a model in which people extract information about shared attitudes and beliefs from others' nonverbal behavior. Consequently, individuals adopted the attitudes and beliefs that they extracted from nonverbal behavior. Ultimately, exposure to nonverbal biases accounted for both individual and regional differences in attitudes, ideals, and behavior. In this sense, the current findings imply that the construction of human culture may bear some resemblance to the construction of culture among some other mammals, for whom social structure (e.g., dominance hierarchies; Mazur, 2005) is built from nonspoken communication.

References

Abrams, J. J., et al. (Producers). (2004–2009). *Lost* [Television series]. New York: American Broadcasting Company.

Ambady, N., Bernieri, F. J., & Richeson, J. A. (2000). Toward a histology of social behavior: Judgmental accuracy from thin slices of the behavioral stream. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 32, pp. 201–271). San Diego, CA: Academic Press.

Ambady, N., & Rosenthal, R. (1992). Thin slices of expressive behavior as predictors of interpersonal consequences: A meta-analysis. *Psychological Bulletin, 111,* 256–274.

Argyle, M., & Cook, M. (1976). *Gaze and mutual gaze.* Cambridge, England: Cambridge University Press.

Aust, C. F., & Zillmann, D. (1996). Effects of victim exemplification in television news on viewer perception of social issues. *Journalism & Mass Communication Quarterly, 73,* 787–803.

Bar, M., Neta, M., & Linz, H. (2006). Very first impressions. *Emotion, 6,* 269–278.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173–1182.

Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind.* Cambridge, MA: MIT Press.

Berry, D. S. (1991). Accuracy in social perception: Contributions of facial and vocal information. *Journal of Personality and Social Psychology, 61,* 298–307.

Birkeland, R., Thompson, J. K., Herbozo, S., Roehrig, M., Cafri, G., & Van Den Berg, P. (2005). Media exposure, mood, and body image dissatisfaction: An experimental test of person versus product priming. *Body Image, 2,* 53–61.

Brener, N. D., Collins, J. L., Kann, L., Warren, C. W., & Williams, B. I. (1995). Reliability of the youth risk behavior survey questionnaire. *American Journal of Epidemiology, 141,* 575–580.

Brener, N. D., Kann, L., McManus, T., Kinchen, S. A., Sandberg, E. C., & Ross, J. G. (2002). Reliability of the 1999 Youth Risk Behavior Survey questionnaire. *Journal of Adolescent Health, 31,* 336–342.

Brener, N. D., McManus, T., Galuska, D. A., Lowry, R., & Wechsler, H. (2003). In response: Self-reported height and weight and the definition of obesity in epidemiological studies. *Journal of Adolescent Health Care, 33,* 141–142.

Bright, K., et al. (Producers). (1994–2004). *Friends* [Television series]. New York: National Broadcasting Company.

Brosius, H. B., & Bathelt, A. (1994). The utility of exemplars in persuasive communications. *Communication Research, 21,* 48–78.

Bryant, J., & Zillmann, D. (Eds.). (2002). *Media effects: Advances in theory and research* (2nd ed.). Mahwah, NJ: Erlbaum.

Chaikin, A., Sigler, E., & Derlega, V. (1974). Nonverbal mediators of teacher expectancy effects. *Journal of Personality and Social Psychology, 30,* 144–149.

Cherry, M., et al. (Producers). (2004–2009). *Desperate housewives* [Television series]. New York: American Broadcasting Company.

Conway, L. G. (2004). Social contagion of time perception. *Journal of Experimental Social Psychology, 40,* 113–120.

Crandall, C. S. (1994). Prejudice against fat people: Ideology and self-interest. *Journal of Personality and Social Psychology, 66,* 882–894.

Cutting, J. E., & Kozlowski, L. T. (1977). Recognizing friends from their walk: Gait perception without familiarity clues. *Bulletin of the Psychonomic Society, 9,* 353–356.

Dalton, M., Sargent, J., Beach, M., Titus-Ernstoff, L., Gibson, J., Ahrens, M., et al. (2003). Effect of viewing smoking in movies on adolescent smoking initiation: A cohort study. *Lancet, 362,* 281–285.

David, L., et al. (Producers). (1990–1998). *Seinfeld* [Television series]. New York: National Broadcasting Company.

Dittmar, H., & Howard, S. (2004). Thin-ideal internalization and social comparison tendency as moderators of media models' impact on women's body-focused anxiety. *Journal of Social and Clinical Psychology, 23,* 768–791.

Dougherty, T. W., Ebert, R. J., & Callender, J. C. (1986). Policy capturing in the employment interview. *Journal of Applied Psychology, 71,* 9–15.

Dovidio, J., Kawakami, K., Johnson, C., Johnson, B., & Howard, A. (1997). On the nature of prejudice: Automatic and controlled processes. *Journal of Experimental Social Psychology, 33,* 510–540.

Dugan, D., et al. (Producers). (2000–2008). *Girlfriends* [Television series]. Burbank, CA: The CW Television Network.

Eaton, K. E., Kann, L., Kinchen, S., Ross, J., Hawkins, J., Harris, W. A., et al. (2006). Youth risk behavior surveillance: United States, 2005. *Morbidity and Mortality Weekly Report, 55*(SS05), 1–108.

Ekman, P. (1982). *Emotion in the human face.* Cambridge, England: Cambridge University Press.

Fouts, G., & Burggraf, K. (1999). Television situation comedies: Female body images and verbal reinforcement. *Sex Roles, 40,* 473–481.

Fouts, G., & Burggraf, K. (2000). Television situation comedies: Female weight, male negative comments and audience reactions. *Sex Roles, 42,* 925–932.

Gerbner, G., & Gross, L. (1976). Living with television: The violence profile. *Journal of Communication, 26,* 173–199.

Gerbner, G., Gross, L., Morgan, M., & Signorelli, N. (1980). The "mainstreaming" of America: Violence profile no. 11. *Journal of Communication, 30,* 10–29.

Gerbner, G., Gross, L., Signorelli, N., & Morgan, M. (1980). Aging with television: Images on television drama and conceptions of social reality. *Journal of Communication, 30,* 37–47.

Gibson, R., & Zillmann, D. (1994). Exaggerated versus representative exemplification in news reports: Perception of issues and personal consequences. *Communication Research, 21,* 603–624.

Grabe, S., & Hyde, J. S. (2006). Ethnicity and body dissatisfaction in the United States: A meta-analysis. *Psychological Bulletin, 132,* 622–640.

Greenberg, J., Solomon, S., & Pyszczynski, T. (1997). Terror management theory of self-esteem and cultural worldviews: Empirical assessments and cultural refinements. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 29, pp. 61–139). San Diego, CA: Academic Press.

Groesz, L. M., Levine, M. P., & Murnen, S. K. (2002). The effect of experimental presentation of thin media images on body satisfaction: A meta-analytic review. *International Journal of Eating Disorders, 31,* 1–16.

Hardin, C. D., & Higgins, E. T. (1996). Shared reality: How social verification makes the subjective objective. In R. M. Sorrentino & E. T. Higgins (Eds.), *Handbook of motivation and cognition: The interpersonal context* (Vol. 3, pp. 28–84). New York: Guilford Press.

Harris, M. J., & Garris, C. P. (2008). You never get a second chance to make a first impression: Behavioral consequences of first impressions. In N. Ambady & J. Skowronski (Eds.), *First impressions.* New York: Guilford Press.

Harris, M. J., Moniz, A. J., Sowards, B. A., & Krane, K. (1994). Mediation of interpersonal expectancy effects: Expectancies about the elderly. *Social Psychology Quarterly, 57,* 36–48.

Harris, M. J., & Rosenthal, R. (1985). Mediation of interpersonal expectancy effects: 31 meta-analyses. *Psychological Bulletin, 97,* 363–386.

Hatfield, J. T., Cacioppo, J. C., & Rapson, R. L. (1994). *Emotional contagion.* Cambridge, England: Cambridge University Press.

Hayek, S., et al. (Producers). (2006–2009). *Ugly Betty* [Television series]. New York: American Broadcasting Company.

Heatherton, T. F., Herman, C. P., Polivy, J., King, G. A., & McGree, S. T. (1988). The (mis)measurement of restraint: An analysis of conceptual and psychometric issues. *Journal of Abnormal Psychology, 97,* 19–28.

Hebl, M., & Dovidio, J. F. (2005). Promoting the "social" in the examination of social stigmas. *Personality and Social Psychology Review, 9,* 156–182.

Hill, T., Lewicki, P., Czyzewska, M., & Boss, A. (1989). Self-perpetuating development of encoding biases in person perception. *Journal of Personality and Social Psychology, 57,* 373–387.

Howard, D. J., & Gengler, C. (2001). Emotional contagion effects on product attitudes. *Journal of Consumer Research, 28,* 189–201.

Hudis, M., et al. (Producers). (1998–2006). *That 70s show* [Television series]. Los Angeles, CA: 20th Century Fox Film Corporation.

Keel, P. K., & Klump, K. L. (2003). Are eating disorders culture-bound syndromes? Implications for conceptualizing their etiology. *Psychological Bulletin, 129,* 747–769.

Kilbourne, J. (1999). *Deadly persuasion: Why women and girls must fight the addictive power of advertising.* New York: Free Press.

King, E. B., Shapiro, J. R., Hebl, M. R., Singletary, S. L., & Turner, S. (2006). The stigma of obesity in customer service: A mechanism for remediation and bottom-line consequences of interpersonal discrimination. *Journal of Applied Psychology, 91,* 579–593.

King, M. P., et al. (Producers). (1998–2004). *Sex and the city* [Television series]. New York: Home Box Office.

Kozlowski, L. T., & Cutting, J. E. (1977). Recognizing the sex of a walker from a dynamic point-light display. *Perception and Psychophysics, 21,* 575–580.

Krebs, D. L., & Janicki, M. (2004). Biological foundations of moral norms. In M. Schaller & C. Crandall (Eds.), *Psychological foundations of culture* (pp. 125–148). Hillsdale, NJ: Erlbaum.

Kring, T., et al. (Producers). (2006–2009). *Heroes* [Television series]. New York: National Broadcasting Company.

Latane, B. (1996). Dynamic social impact: The creation of culture by communication. *Journal of Communication, 46,* 13–25.

Lawrence, B., et al. (Producers). (2001–2008). *Scrubs* [Television series]. New York: National Broadcasting Company.

Levine, M. P., & Smolak, L. (1996). Media as a context for the development of disordered eating. In L. Smolak, M. P. Levine, & R. Striegel-Moore (Eds.), *The developmental psychopathology of eating disorders* (pp. 235–257). Hillsdale, NJ: Erlbaum.

Lewicki, P., Hill, T., & Czyzewska, M. (1992). Nonconscious acquisition of information. *American Psychologist, 47,* 796–801.

Lindberg, L., & Hjern, A. (2003). Risk factors for anorexia nervosa: A national cohort study. *International Journal of Eating Disorders, 34,* 397–408.

Lowery, B. S., Hardin, C. D., & Sinclair, S. (2001). Social influence effects on automatic racial prejudice. *Journal of Personality and Social Psychology, 81,* 842–855.

MacFarlane, S., et al. (Producers). (1999–2009). *Family guy* [Television series]. Los Angeles, CA: 20th Century Fox Film Corporation.

Manusov, V., & Jaworski, A. (2006). Casting nonverbal behavior in the media: Representation and responses. In V. Manusov & M. L. Patterson (Eds.), *The SAGE handbook of nonverbal communication* (pp. 237–258). Thousand Oaks, CA: Sage.

Mazur, A. (2005). *Biosociology of dominance and deference.* Lanham, MD: Rowman & Littlefield.

McLeod, P. L., & Rosenthal, R. (1983). Micromomentary movement and the decoding of face and body cues. *Journal of Nonverbal Behavior, 8,* 83–90.

Mehrabian, A. (1972). *Nonverbal communication.* Chicago: Aldine-Atherton.

Mutchnick, M., et al. (Producers). (1998–2006). *Will and Grace* [Television series]. New York: National Broadcasting Company.

Nisbett, R. E., & Cohen, D. E. (1996). *Culture of honor: The psychology of violence in the south.* Boulder, CO: Westview Press.

Pessoa, L., Japee, S., Sturman, D., & Ungerleider, L. G. (2006). Target visibility and visual awareness modulate amygdala responses to fearful faces. *Cerebral Cortex, 16,* 366–375.

Pessoa, L., Japee, S., & Ungerleider, L. G. (2005). Visual awareness and the detection of fearful faces. *Emotion, 5,* 243–247.

Pew. (2007). *Pew Research Center for the People and the Press and Pew Forum on Religion and Public Life, August 2007 religion and public life survey.* Washington, DC: Pew Research Center for the People and the Press.

Polivy, J., & Herman, C. P. (2002). Causes of eating disorders. *Annual Review of Psychology, 53,* 187–213.

Polone, G., et al. (Producers). (2000–2007). *Gilmore girls* [Television series]. Burbank, CA: The CW Television Network.

Prange, G., et al. (Producers). (2003–2009). *One Tree Hill* [Television series]. Burbank, CA: The CW Television Network.

Rhimes, S., et al. (Producers). (2005–2009). *Grey's anatomy* [Television series]. New York: American Broadcasting Company.

Rodin, J., Silberstein, L. R., & Striegel-Moore, R. H. (1985). Women and weight: A normative discontent. In T. B. Sonderegger (Ed.), *Nebraska symposium on motivation. Vol. 32: Psychology and gender* (pp. 267–307). Lincoln: University of Nebraska Press.

Rosenthal, R., Hall, J. A., DiMatteo, M. R., Rogers, P. L., & Archer, D. (1979). *Sensitivity to nonverbal communication.* Baltimore, MD: Johns Hopkins University Press.

Runeson, S., & Frykholm, G. (1983). Kinematic specification of dynamics as an informal basis for person and action perception: Expectation, gender recognition, and deceptive intention. *Journal of Experimental Psychology: General, 112,* 580–610.

Schwartz, J., et al. (Producers). (2003–2007). *The OC* [Television series]. Los Angeles, CA: 20th Century Fox Film Corporation.

Shore, D., et al. (Producers). (2004–2009). *House* [Television series]. Los Angeles, CA: 20th Century Fox Film Corporation.

Stice, E. (2001). A prospective test of the dual-pathway model of bulimic pathology: Mediating effects of dieting and negative affect. *Journal of Abnormal Psychology, 110,* 124–135.

Stice, E., & Agras, W. S. (1998). Predicting onset and cessation of bulimic behaviors during adolescence: A longitudinal grouping analysis. *Behavior Therapy, 29,* 257–276.

Striegel-Moore, R. H., & Franko, D. L. (2002). Body image issues among girls and women. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research, and clinical practice* (pp. 183–191). New York: Guilford Press.

Stunkard, A. J., Sorenson, T., & Schulsinger, F. (1983). Use of the Danish Adoption Register for the study of obesity and thinness. In S. Kety (Ed.), *The genetics of neurological and psychiatric disturbances* (pp. 115–120). New York: Raven Press.

Thomas, R., et al. (Producers). (2004–2007). *Veronica Mars* [Television series]. Burbank, CA: The CW Television Network.

Thompson, J. K., Heinberg, L. J., Altabe, M., & Tantleff-Dunn, S. (1999). *Exacting beauty: Theory assessment, and treatment of body image disturbance.* Washington, DC: American Psychological Association.

Thompson, J. K., & Stice, E. (2001). Thin-ideal internalization: Mounting evidence for a new risk factor for body-image disturbance and eating pathology. *Current Directions in Psychological Science, 10,* 181–183.

Thompson, J. K., & van den Berg, P. (2002). Measuring body image attitudes among adolescents and adults. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research, and clinical practice* (pp. 183–191). New York: Guilford Press.

Tiggemann, M. (2002). Media influences on body image development. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research, and clinical practice* (pp. 91–102). New York: Guilford Press.

Weisbuch, M., & Ambady, N. (in press). Thin-slice vision. In R. B. Adams, N. Ambady, K. Nakayama, & S. Shimojo (Eds.), *The science of social vision*. New York: Oxford University Press.

Williams, L. M., Liddell, B. J., Rathjen, J., Brown, K. J., Gray, J., Phillips, M., et al. (2004). Mapping the time course of nonconscious and conscious perception of fear: An integration of central and peripheral measures. *Human Brain Mapping, 21,* 64–74.

Word, C., Zanna, M., & Cooper, J. (1974). The nonverbal mediation of self-fulfilling prophecies. *Journal of Experimental Social Psychology, 10,* 109–120.

World Values Survey. (2005). *Official data file v. 20081015.* Madrid, Spain: World Values Survey Association.

Zillmann, D. (2002). Exemplification theory of media influence. In J. Bryant & D. Zillmann (Eds.), *Media effects: Advances in theory and research* (2nd ed., pp. 19–41). Mahwah, NJ: Erlbaum.

Appendix

Sampled Television Shows and Study 4 Regions

The television shows included in Study 1 were *Desperate Housewives* (Cherry et al., 2004–2009), *Family Guy* (MacFarlane et al., 1999–2009), *Friends* (Bright et al., 1994–2004), *Girlfriends* (Dugan et al., 2000–2008), *Gilmore Girls* (Polone et al., 2000–2007), *Grey's Anatomy* (Rhimes et al., 2005–2009), *Heroes* (Kring et al., 2006–2009), *House* (Shore et al., 2004–2009), *Lost* (Abrams et al., 2004–2009), *One Tree Hill* (Prange et al., 2003–2009), *Sex and the City* (King et al., 1998–2004), *Scrubs* (Lawrence et al., 2001–2008), *Seinfeld* (David et al., 1990–1998), *That 70s Show* (Hudis et al., 1998–2006), *The OC* (Schwartz et al., 2003–2007), *Ugly Betty* (Hayek et al., 2006–2009), *Veronica Mars* (Thomas et al., 2004–2007), and *Will and Grace* (Mutchnick et al., 1998–2006).

The 22 regions included in Study 4 are listed below and include columns corresponding to the name of the region according to Nielsen (Column 1), the CDC (Column 2), and us (Column 3).

Nielsen region name	CDC region name	Study 4 region name
Baltimore	Baltimore	Baltimore
Boston	Boston	Boston
Charlotte	Charlotte-Mecklenburg (NC)	Charlotte
Chicago	Chicago	Chicago
Denver	Colorado	Colorado
Hartford & New Haven	Connecticut	Connecticut
Washington, DC	Washington, DC	Washington, DC
Dallas-Fort Worth	Dallas	Dallas
Detroit	Detroit	Detroit
Los Angeles	Los Angeles	Los Angeles
Memphis	Memphis	Memphis
Miami-Fort Lauderdale	Miami-Dade County	Miami
Milwaukee	Milwaukee	Milwaukee
Albuquerque-Sante Fe	New Mexico	New Mexico
New York City	New York City	New York City
Oklahoma City	Oklahoma	Oklahoma
Orlando	Orange County, FL	Orlando
West Palm Beach, FL	Palm Beach County, FL	Palm Beach
Providence-New Bedford	Rhode Island	Rhode Island
San Diego	San Diego	San Diego
San Francisco-Oakland-San Jose	San Francisco	San Francisco
Tampa-Saint Petersburg, FL	Hillsborough County, FL	Tampa