Applying Comparison-Induced Distortion Theory to Body-Size Judgments

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Abstract
I propose a comparison-induced-distortion theory account of body-size judgments wherein verbal body-size comparisons (e.g., “Kimberly is thinner than Jane,” Choplin & Hummel, 2002, 2005) bias judgments of body-sizes. Two experiments tested predictions of this account. Unpredicted by previous models, Experiment 1 demonstrated that verbal comparisons affect body-size judgments even though the distribution of contextual body sizes was held constant. Experiment 2 found that verbal comparisons can sometimes bias judgments toward the values to which they are compared. An extremely thin woman was judged larger if she was compared to someone who was much larger than her than if she was compared to someone who was only slightly larger than her. These results demonstrate that research on body-size judgments cannot ignore the effects of verbal comparisons.

Body-Size Judgments
The goal of this paper is to propose and test a comparison-induced-distortion theory (CID theory, Choplin & Hummel, 2002, 2005) account of body-size judgments. The application of CID theory to the problem of body-size judgments was inspired by research investigating the effects of media ideals on body-size judgments (Lavine, Sweeney, & Wagner, 1999; Martin & Kennedy, 1993; Richins, 1991). Contemporary popular media glamorizes unrealistically thin women (Fouts & Burggraf, 2000; Malkin, Wornian, & Chrisler, 1999; Owen & Laurel-Seller, 2000; Spitzer, Henderson, & Zivian, 1999) and this glamorization has negative psychological consequences for women (Bessenoff, 2006; see Groesz, Levine, & Murnen, 2002, for a meta-analysis; Irving, 1990; Stice & Shaw, 1994). In particular, researchers have argued that this glamorization leads to increased body-size dissatisfaction (Garfinkel et al., 1992; Grogan, Williams, & Conner, 1996; Trampe, Stapel, & Siero, 2007), decreased self-esteem (J. K. Thompson & Thompson, 1986), negative mood (Tiggemann & McGill, 2004), feelings of shame (Sanftner, Barlow, Marschal, & Tangney, 1995), depression (Heinberg & Thompson, 1995; J. K. Thompson, 1986), and unhealthy dieting behavior (Garfinkel et al., 1992; Phelps et al., 1993; Stice, Schupak-Neuberg, Shaw, & Stein, 1994; Stice & Shaw, 1994).

Concern over the negative effects of this glamorization has motivated several psychological models of the affective consequences of body-size comparisons. Some have argued that the tendency to compare one’s self to glamorized, unrealistically thin media ideals (upward social comparisons, Festinger, 1954) mediates the impact of media exposure on measures such as body dissatisfaction, negative mood, depression (Bessenoff, 2006; Tiggemann & McGill, 2004), as well as disordered eating (Field, Camargo, Taylor, Berkey, & Colditz, 1999). Likewise, Thompson and his colleagues (J. K. Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999; J. K. Thompson & Stice, 2001) have argued that women internalize media ideals and the discrepancy between their ideal sizes and their actual sizes (Higgins, 1987, 1989) causes negative psychological consequences (Bessenoff, 2006; Harrison, 2001; Strauman, Vookles, Berenstein, Chaiken, & Higgins, 1991). Although the model proposed here is strictly a cognitive model, it might be of use to researchers in further refining models of the affective consequences of media ideals.

The application of CID theory to the problem of body-size judgments was also inspired by the observation that women diagnosed with anorexia nervosa overestimate their body sizes (Bruch, 1962). Prior to Penner, Thompson, and Coover (1991), many researchers assumed that this overestimation was involved in the etiology of the disorder. However, their research found that all thin women overestimate their body sizes. This finding suggests that overestimation probably does not play a role in the etiology of the disorder, but it does leave us with a mystery. Why should thin women overestimate their body sizes?

The few papers that have tried to propose formal models of body-size judgments, rather than the affective consequences of social body-size comparisons, have invoked Helson’s (1964) adaptation-level theory (AL theory, see Choplin & Hummel, 2005; Helson, 1964; Wedell, 1995, for the mathematical implementation of this model) to explain how images in popular media influence body-size judgments (Martin & Kennedy, 1993; Richins, 1991). This theory was originally designed to explain people’s judgments of sensory stimuli such as temperatures. AL theory assumes that people judge temperatures relative to the temperature that feels normal or average to them (the adaptation level). Temperatures that are above the adaptation level are judged hot, and temperatures that are below the adaptation level are judged cold. A given temperature such as 50º Fahrenheit (10º Celsius) will feel warmer in winter than in summer because colder temperatures seem normal in winter, making this temperature high relative to the lower norm. Likewise, this theory assumes that people judge body sizes relative to the body sizes they think are normal or average. Body sizes that are larger than what people think of as normal are judged fat, and body sizes that are smaller are judged thin. A 140-lb (63.5-kg) woman will seem fatter if people think smaller sizes are normal. Popular media images of unrealistically thin women might make thinner women seem normal (Martin & Kennedy, 1993; Richins, 1991). If so, then relative to this artificially created norm thin women will be judged closer to average, average women will be judged larger than average, and large women will be judged extremely large.

Choplin and Hummel (2002) proposed an alternative model of attribute evaluation (CID theory, see Choplin & Hummel, 2005, for the mathematical implementation of this model) to explain how images in popular media influence body-size judgments. In this model, two key processes are involved: the activation of an ideal body size from memory and the distortion of values relative to this norm. The present experiments investigate these processes in a priming context.
CID theory predicts that when the actual difference between two compared body sizes is smaller than the comparison-suggested difference, comparisons will tend to bias body-size judgments apart to better match the larger comparison-suggested difference. For example, assuming that the comparison-suggested difference is 3 or 4 body sizes on Thompson and Gray’s (1995) scale, a comparison between a woman who is approximately the size of the third woman on the scale and a woman who is approximately the size of the eighth woman on the scale (i.e., a difference of five body sizes) will tend to bias judgments of their body sizes together (i.e., toward the comparison-suggested difference of 3 or 4 body sizes). The smaller woman will tend to be judged larger, and the larger woman will tend to be judged smaller than would have been the case without the comparison.

The words used to make comparisons also suggest specific values (Choplin & Hummel, 2002; Rusiecki, 1985). In particular, the word fatter suggests larger body-sizes than the word thinner so using the word fatter to compare body sizes might lead to larger body-size judgments than using the word thinner. Two experiments investigated the effects of language expressible comparisons on body-size judgments. To isolate the effects of language expressible comparisons from other contextual effects (e.g., the mean of contextual values) and discriminate between CID theory and AL theory, Experiment 1 investigated the effects of verbal body-size comparisons on body-size judgments while keeping contextual body-sizes constant (i.e., all participants viewed pictures of the same three women). Experiment 2 compared a smaller-than-average woman either to a woman who was larger than her or to a woman who was much larger than her.

**Experiment 1**

To investigate the effects of language expressible body-size comparisons while keeping contextual values (i.e., the mean) constant, all participants in Experiment 1 viewed pictures of the same three body sizes. We chose pictures of three women—an overweight woman, an average-size woman, and an underweight woman. To measure evaluated sizes of these three women unbiased by comparisons, 89 female pretest participants viewed one of the three pictures. The picture was then removed, and participants judged the size of the woman in the picture from memory using Thompson and Gray’s (1995) scale. Responses were coded by numbering the nine women on Thompson and Gray’s (1995) scale such that the smallest woman was assigned a value of 1, and the largest woman was assigned a value of 9. Results suggested that body-size comparisons suggest a difference (Rusiecki, 1985) of approximately 3 or 4 body sizes on Thompson and Gray’s (1995) scale.

CID theory predicts that when the actual difference between two compared body sizes is smaller than the comparison-suggested difference, comparisons will tend to bias body-size judgments apart to better match the larger comparison-suggested difference. For example, assuming that the comparison-suggested difference is 3 or 4 body sizes on Thompson and Gray’s (1995) scale, a comparison between a woman who is approximately the size of the fourth woman on Thompson and Gray’s (1995) scale and a woman who is approximately the size of the sixth woman on the scale (i.e., a difference of two body sizes) will tend to bias judgments of their body sizes apart (i.e., toward the comparison-suggested difference of 3 or 4 body sizes). The smaller woman will tend to be judged smaller, and the larger woman will tend to be judged larger than would have been the case without the comparison. However, when the actual difference between two compared body sizes is larger than the comparison-suggested difference, CID theory predicts that comparisons will tend to bias body-size judgments closer together, again to better match the comparison-suggested difference. Assuming once again that the comparison-suggested difference is 3 or 4 body sizes on Thompson and Gray’s (1995) scale, a comparison between a woman who is approximately the size of the third woman on the scale and a woman who is approximately the size of the eighth woman on the scale (i.e., a difference of five body sizes) will tend to bias judgments of their body sizes together (i.e., toward the comparison-suggested difference of 3 or 4 body sizes). The smaller woman will tend to be judged larger, and the larger woman will tend to be judged smaller than would have been the case without the comparison.

The words used to make comparisons also suggest specific values (Choplin & Hummel, 2002; Rusiecki, 1985). In particular, the word fatter suggests larger body-sizes than the word thinner so using the word fatter to compare body sizes might lead to larger body-size judgments than using the word thinner. Two experiments investigated the effects of language expressible comparisons on body-size judgments. To isolate the effects of language expressible comparisons from other contextual effects (e.g., the mean of contextual values) and discriminate between CID theory and AL theory, Experiment 1 investigated the effects of verbal body-size comparisons on body-size judgments while keeping contextual body-sizes constant (i.e., all participants viewed pictures of the same three women). Experiment 2 compared a smaller-than-average woman either to a woman who was larger than her or to a woman who was much larger than her.
unbiased sizes of the average-size woman and the
underweight woman (difference = 6.17 - 4.86 = 1.49), were
both less than the comparison-suggested difference of 3 or 4
body sizes as roughly estimated in the pretest, CID theory
predicts that comparisons ought to bias judgments apart in
this experiment. The average-sized woman ought to be
judged smaller when compared to the overweight woman
than when compared to the underweight woman. Because
comparing women’s body sizes in English using the
comparison word fatter implies that their body sizes are
large, the average-size woman might be judged larger when
she is compared using the word fatter than when she is
compared using the word thinner. AL theory does not
predict any effects of language. Indeed, because participants
saw all three women, and the mean of the contextual values
was thereby held constant, there is no mechanism in AL
time that would change body-size judgments across the
conditions in this experiment.

Discussion of Experiment 1
These results indicate that pairwise, language-expressive
comparisons affect judgments of body size even when
contextual body sizes are held constant. CID theory predicts
that whenever unbiased differences between body sizes are
smaller than comparison-suggested differences,
comparisons will tend to bias judgments apart so that the
target body size in Experiment 1 should have been judged
larger after being compared to the smaller body size than
after being compared to the larger body size. Thus the
results of Experiment 1 were consistent with the predictions
of CID theory. By contrast, AL theory has no mechanism
whereby language would affect estimation.

Choplin and Hummel (2002) also predicted that the
specific words used to make body-size comparisons will
affect body-size judgments such that the comparison word
fatter suggests large body sizes and the comparison word
thinner suggests small body sizes. The results of
Experiment 1 were consistent with this prediction. AL
time has no mechanism that can account for this effect.

Experiment 2
One possible interpretation of Experiment 1 is that more
attention might have been given to the compared women
than to the ignored woman. If so, than a variation of AL
time (not Nelson’s, 1964, original formalization) that
places greater weight on attended sizes could account for the
results of Experiment 1. However, this variation would
always predict contrast effects. That is, comparing—and
thereby attending—to sizes will always bias evaluations of
those sizes apart. CID theory, by contrast, predicts that
comparisons will bias size evaluations toward the sizes to
which they are compared when the unbiased difference is
larger than a comparison-suggested difference.

In Experiment 2 a picture of a smaller-than-average
woman (labeled “Kimberly”) was used as the target.
Kimberly was compared to one of two other women, both
labeled “Jane”: an average-sized woman (henceforth,
“Medium Jane”) and an overweight woman (henceforth,
“Large Jane”). One hundred fifty four female pretest
participants judged the unbiased size of one of the three
women using Thompson and Gray’s (1995) scale while her
picture remained in view. This pretest found that
Kimberly’s unbiased size was 3.12 (SD = 1.22, N = 50),
Medium Jane’s was 7.54 (SD = 0.79, N = 54), and Large
Jane’s was 8.42 (SD = 0.64, N = 50).

Participants in Experiment 2 viewed a picture of
Kimberly and a picture of one Jane (either Medium Jane
or Large Jane) presented simultaneously. They compared
sizes and then identified on Thompson and Gray’s (1995) scale
the woman that most closely resembled Kimberly and the
woman that most closely resembled Jane. The entire
experiment was presented on the same piece of paper so that
participants could judge body sizes while the pictures
remained in view. Because the unbiased difference between
Kimberly and Large Jane (difference = 8.42 - 3.12 = 5.3)
differs from the comparison-suggested difference to a
greater degree than does the unbiased difference between
Kimberly and Medium Jane (difference = 7.54 - 3.12 =
4.42). CID theory predicts that Kimberly will be judged
larger when she is compared to Large Jane than when she is
compared to Medium Jane. AL theory predicts the opposite.
Because Large Jane creates a higher-average context than
Medium Jane does, AL theory predicts that Kimberly will
be judged smaller in the context created by Large Jane than
in the context created by Medium Jane.

Method
Participants. The experimenter approached prospective
participants on campus or in the surrounding university
community and asked them if they would like to participate.
Two hundred seventy-nine women agreed to participate
after being approached in this manner. Of these 279 women,
116 compared Kimberly to Large Jane, and 163 compared
Kimberly to Medium Jane.

Materials and Procedure. Participants viewed pictures of
two women (Kimberly and either of the two Janes) and
compared their body sizes—either answering the question
“Who is thinner?” or the question “Who is fatter?” by
circling the correct name. They then judged Kimberly’s
body size and Jane’s body size using Thompson and Gray’s
(1995) scale. To test whether the effects of comparisons
would be observable while sizes remained in view, the
comparison task and the judgment task were presented on
the same 8.5”x11” piece of paper so that the pictures of the
women remained in view during the judgment task.

Results
Responses were coded as in the pretests and in Experiment
1. When Kimberly was compared to Medium Jane,
Kimberly’s body size on Thompson and Gray’s (1995) scale
was judged to be 3.01 (SD = 1.45), which was not
significantly different from her size judged alone (M = 3.12,
SD = 1.22), t(211) = 0.58, p > .05, and Medium Jane’s body
size was judged to be 7.52 (SD = 0.88), which again was not
significantly different from her size judged alone (M = 7.54,
SD = 0.79), t(215) = 0.87, p > .05. The difference between
these judgments of their body sizes when they were
compared (M = 4.51, SD = 1.57) was also not significantly
different from the difference between the judgments of their
body sizes unbiased by comparisons (M = 4.42), t(162) =
0.85, p > .05. When Kimberly was compared to Large Jane,
however, Kimberly’s body size was judged to be 3.71 (SD =
1.37), which was significantly larger than her size judged
alone, t(164) = 2.50, p = .01. Perhaps due to a ceiling effect,
Large Jane’s body size (M = 8.50, SD = 0.55) was not
significantly different from her size judged alone (M = 8.42,
SD = 0.64), t(164) = 0.82, p > .05. The difference between
the judgments of their body sizes when they were
compared (M = 4.79, SD = 1.49) was significantly smaller than
the difference between the judgments of their body sizes when
they were judged alone (M = 5.30), t(115) = 3.48, p < .01.

A 2 (comparison woman: Medium Jane vs. Large Jane) x
2 (wording: thinner vs. fatter) between-subjects ANOVA
was performed on judgments of Kimberly’s body size. This
analysis revealed that participants who compared her to
Large Jane judged her size to be larger than did participants
who compared her to Medium Jane, F(1, 275) = 16.82, MSE
= 1.97, p < .01. The ANOVA also revealed that participants
who compared Kimberly to the other women using the word
fatter judged her size to be larger (M = 3.60) than did participants
who compared her to the other women using the word
thinner (M = 3.12), F(1, 275) = 7.70, MSE = 1.97, p < .01.
The ANOVA failed to reveal an interaction, F < 1.

Discussion of Experiment 2
Consistent with the predictions of CID theory and
inconsistent with the predictions of AL theory, the
difference between judgments of Kimberly’s body size and
judgments of Large Jane’s body size was smaller when the
two women were compared than when they were judged
alone, and Kimberly was judged larger when she was
compared to Large Jane than when she was judged alone or
when she was compared to Medium Jane. This study also
demonstrates that comparison-induced distortions of body-
size judgments occur even when participants are not relying
on memory but still have the images to be judged in view.

AL theory made very different predictions than those
made by CID theory. Because the presentation of Large
Jane created a context with a higher average body size than
did the presentation of Medium Jane, AL theory predicted
that Kimberly would be judged smaller in the context of
Large Jane than in the context of Medium Jane. But, in fact,
Kimberly was judged larger in the context of Large Jane
than in the context of Medium Jane. The results of this study
are therefore inconsistent with AL theory predictions.

Choplin and Hummel (2002) also predicted that
Kimberly’s body size ought to be judged smaller when she
was compared using the comparison word thinner than
when she was compared using the comparison word fatter.
The results were consistent with this prediction as well.

General Discussion
Two experiments pitted the predictions of the CID-theory
account of body-size misjudgments against the predictions
of the AL-theory account of body-size misjudgments. Experiment 1 investigated the effects of language-
expressible comparisons while contextual body sizes were
held constant. CID theory predicted that language-
expressible comparisons would affect body-size judgments.
However, because there was no change in the distribution of
contextual body sizes (the average body size was the same
across all conditions), AL theory has no mechanism by
which language-expressible comparisons could affect body-
size judgments in this experiment. Thus, consistent with the
predictions of CID theory and not predicted by AL theory,
language-expressible comparisons affected participants’
judgments of body size in Experiment 1.

Experiment 2 investigated the effects of the size of the
difference between two compared body sizes on
participants’ judgments of body size. Because the large
difference in this experiment exceeded the comparison-
suggested difference to a greater degree than the smaller
difference did, CID theory predicted that the woman with
the small body size (Kimberly) would be judged larger.
when there was a large difference between her and the woman to whom she was compared than when there was a smaller difference. By contrast, because the average contextual body size was larger when there was a large difference than when there was a smaller difference, AL theory predicted that the woman with the small body size (Kimberly) would be judged smaller when there was a large difference than when there was a smaller difference. Consistent with CID theory and inconsistent with AL theory, the smaller woman was judged larger when there was a large difference between her and the woman to whom she was compared than when there was a small difference.

**Future Research**

The account of body-size misjudgments offered by CID theory might offer key insights into body-size misjudgments that should be pursued in future research. For example, previous research on body-size misjudgments has found that people’s susceptibility to body-size misjudgments and dissatisfaction is affected by sex (Grogan et al., 1996), age (Phelps et al., 1993), race (Desmond, Price, Hallinan, & Smith, 1989; Franko & Striegel-Moore, 2002), socioeconomic status (Sobal & Stunkard, 1989), and acculturation into American culture (Hazuda, Haffner, Stern, & Eifler, 2002). CID theory suggests a number of places where future research might look for explanations into these between-group differences. First, some groups might be more likely to compare body sizes than other groups. For example, older men may be less likely to compare body sizes than are younger women. Alternatively, body-size comparisons might be more important to these groups (greater importance of the comparison could be modeled by giving CID theory’s weighting parameter, Parameter w, see Choplin & Hummel, 2005, a larger value).

Additionally, some groups might have a tendency to compare themselves to smaller body sizes. European American women, for example, might be more likely to compare themselves to extremely thin white supermodels than African American women might be. Idiosyncratic linguistic norms may also explain some of this pattern of susceptibility. For instance, some groups might use body-size comparisons to describe smaller differences in body size than other groups. Some groups might describe a difference of five pounds as “fatter” while other groups might describe this difference as “approximately the same.” Groups that are less likely to describe small body-size differences using words like fatter or thinner might be less likely to overestimate body-size differences. Future research should investigate these idiosyncratic linguistic norms and possible links between these norms and the etiology of body-size dissatisfaction.

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**References**


