I'm "better" than you: Social comparison language suggests quantitative differences

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Abstract

Comparison-induced distortion theory (Choplin 2007; Choplin and Hummel 2002) describes how comparison words like "better" suggest quantitative differences between compared values. When a comparison word is used to contrast a personal attribute value with some standard (e.g. "Your score is better than average"), the comparison-suggested difference for the word may bias estimates or recall of personal attribute values. Three studies investigated how comparison-suggested differences determine the effect of social comparison on estimates or recall of personal attribute values. The first study demonstrated that estimates of attributes are biased towards (assimilation) or away from (contrast) a comparison standard depending on whether the difference between the compared attribute values exceeds or falls below the comparison-suggested difference. The second study showed that the comparison language selected by participants (through the difference suggested by the language) mediated the effect of standard similarity on attribute estimates following a social comparison. The third study demonstrated concurrent assimilation and contrast effects in recall of attribute values due to the size of the observed difference between the self and the standard for the attribute. Unlike in previous research on social comparison, assimilation and contrast patterns in these studies can be explained through a single process.

Keywords
social comparison, assimilation, contrast, comparison language

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1. Introduction

Without knowledge about the attributes and accomplishments of others, it can be difficult to appreciate how good (or bad) our own qualities are (Festinger 1954). Since the role of social comparison in self-perception was described by Festinger (1954), the way comparison influences self-evaluations and estimates of personal behaviors and attributes has been an active area of research (for reviews, see Buunk and Gibbons 2007; Kruglanski and Mayseless 1990). In this paper, we explore how the language-based mechanisms documented in previous research by Choplin and her colleagues (Choplin and Hummel 2002; Choplin 2007, 2010) affect people's estimates of their own abilities and personal attributes following social comparison.

Most research in social comparison can be characterized as a search for a classification scheme delineating those conditions where social comparison leads to bias away from the recall, estimation or judgment of the comparison standard (*contrast*) from the conditions where social comparison leads to bias towards the standard (*assimilation*; e.g. Pelham and Wachsmuth 1995; Schwarz and Bless 1992; Stapel and Winkielman 1998; Suls et al. 2002; see Buunk and Gibbons 2007 for a review). For example, Mussweiler and his colleagues (Mussweiler 2001, 2003; Mussweiler and Strack 1999, 2000) argued that focusing on similarities leads a person to retrieve information about the self that is consistent with information about the standard, producing assimilation, while focusing on dissimilarities leads one to retrieve information about how the self is *different* from the standard, producing contrast. Schwarz and Bless (1992, 2007) describe how standard information influences perception of the target through its category membership. If the comparison standard is excluded from the category to which the target of the comparison belongs, contrast results; if the standard is used to interpret the target by including the standard information in the same category with the target, assimilation results (Schwarz and Bless 1992). Both theories depict separate processes at work in assimilation and contrast effects, and these separate processes allow for the prediction of when assimilation versus contrast will occur following a social comparison. The purpose of the current paper is to demonstrate that the influence of comparison language can explain both assimilation and contrast patterns in social comparisons through a common process.

Past research has revealed that comparison words and phrases convey more information than ordinal differences between compared values. Rather, comparisons such as "faster," "taller," and "much more" also convey information about *quantitative* differences between values (Choplin and Hummel 2002; Rusiecki 1985). For example, Rusiecki (1985) found that participants interpreted comparison words like "taller" to imply a limited range of difference between values (e.g. 2–5 inches difference for women's heights), with substan-

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tial consistency across participants in the size of the inferred differences. These findings indicated that participants in his study shared largely similar beliefs about the magnitude of the difference implied by the comparison words, and used these implied differences in making estimates of compared values. The difference in magnitude implied by a comparison word or phrase in a particular context (e.g. "taller" in the context of women's heights) is the *comparison-suggested difference* (henceforth CSD) for that word/phrase (Choplin 2007).

Research exploring comparison-induced distortion (henceforth CID) (e.g. Choplin and Hummel 2002; Choplin and Motyka 2007; Choplin and Tawney 2005) demonstrates that the comparison-suggested difference can systematically bias evaluations, estimates and recall of compared values. If two compared values differ by an amount *less* than the CSD for the presented comparison language, the CSD will compete with the objective information of the actual difference and the values will tend to be represented as further apart in magnitude than they actually are (Choplin 2007). As a result, evaluations of the values will be more different than they would have been if they were not compared, the values will be recalled as further apart than they actually were, and estimates of the values will be adjusted to be further apart. Similarly, two compared values differing by more than the CSD will be represented as closer together in magnitude than they actually are and recalled, estimated or judged as closer together than if they had not been compared (Choplin 2007). Further, because the CSD depends on the comparison language used, the effect of comparison on the representations of the compared values will depend on the particular comparison word or phrase applied. For instance, "a completely different ballpark" implies a larger difference than does "different," and comparing two values using the former phrase results in their being represented as further apart (e.g. prices so compared are given ratings of expensiveness that are further apart) than if the same pair of values are compared with "different" (Bloomfield and Choplin 2008). Distortion arising from comparison in line with the predictions of CID theory has been demonstrated in the recall of geometric shapes (Choplin and Hummel 2002), estimates of building heights (Choplin and Tawney 2005), amount of food consumed (Choplin and Motyka 2007) and other domains (Choplin 2007). The studies reported here extend this work to the domain of social comparison.

To illustrate how a comparison-suggested difference (arising from a particular comparison word or phrase) might influence the result of a social comparison, consider a prototypical childhood scuffle:

(1) Emily: "Oh, yeah? You think you can run *faster* than me?"
Morgan: "You bet I can!"

In a strictly formal sense, Morgan's agreement with Emily's challenge is accurate as long as she arrives at some destination (e.g. the end of the race path)

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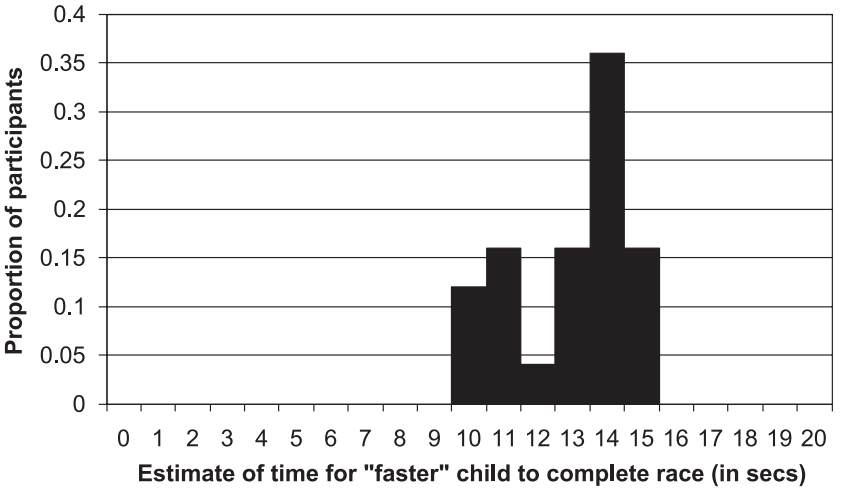


Figure 1. *The distribution of children's running speeds that are "faster" than 15.5 seconds.*

before Emily, regardless of whether she arrives 2 milliseconds, 2 seconds or 2 hours before. It is unlikely, however, that the pragmatics of the conversation allow for such a liberal set of possibilities (Grice 1975). For instance, the word "faster" was most likely not intended to include the possibility that she would arrive 2 milliseconds before Emily (although such small differences qualify as "faster" in the Olympics, they do not generally count as a difference in childhood conflicts). The word "faster" was also unlikely to be meant to imply that she would arrive *days* before Emily. Simply put, a comparison implies a much narrower distribution of values than formal, truth-conditional interpretations would accept (Choplin 2007; Rusiecki 1985).

The method developed by Rusiecki (1985) can be used to generate the distribution of CSDs for "faster" or other comparison words/phrases with pre-test participants. For instance, to examine the CSD for "faster" in children's running speeds, participants were given the scenario:

> Imagine two 8 year-olds are racing each other down a 50-foot path. Child 1 runs the 50-foot path in 15.5 seconds. Child 2 runs faster than Child 1. How long do you imagine it takes Child 2 to run the 50-foot path?

Figure 1 shows the distribution of responses to the scenario for twenty-three participants. This distribution is relatively unimodal, indicating that some differences in speed are better examples of "faster" than others. The median speed offered by pre-test participants was 14 seconds, indicating a median comparison-suggested difference for "faster" of 1.5 seconds. Although the CSD for a particular comparison word or phrase will differ somewhat among

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individuals, it may be estimated with pre-test participants using the above method and used to predict the average inferred difference for a comparison phrase in an experiment with a separate group of participants (Choplin 2007). Other likely influences on the CSD, such as the context in which the language is applied (e.g. "faster" may imply a smaller CSD for adults than children, since a few milliseconds can make the difference between a gold and silver medal in the Olympics) and the presence of modifiers ("slightly faster" will imply a different distribution of speeds, with a lower median CSD) can be taken into account by adjusting the stimuli used for pre-testing appropriately.

CID theory predicts that the effect of the comparison language (and its comparison-suggested difference) on Morgan's estimate of her own running speed will depend on two factors (Choplin 2007). The first is how likely Morgan is to use the comparison information (i.e. Emily's speed and the comparison-suggested difference for "faster"). In the absence of objective knowledge of personal attributes, people's estimates will be inexact and uncertain and they may seek social comparison information (Festinger 1954). If Morgan's speed had just been timed the day before, she would likely rely on this value and disregard the comparison information in making her estimate. However, if Morgan had never run this particular path before, her pre-comparison (unbiased) estimate would be highly variable and she would have little confidence in its accuracy. In this case, the normative strategy would be for her to combine her unbiased estimate with the information provided by the social comparison using Bayes' theorem (Huttenlocher et al. 2000). Through this type of process, CID theory (Choplin 2007; Choplin and Hummel 2002, 2005) predicts that comparison information will bias estimates and recall of values when the unbiased estimate is based on limited knowledge or is poorly remembered.[1]

If Morgan does take comparison information into account, the second factor determining its effect on her estimate will be how the difference between her unbiased estimate (her speed estimate prior to considering the comparison with Emily) and Emily's speed deviates from the comparison-suggested difference for "faster" (Choplin 2007). When this initial difference is greater than the CSD, using comparison information will bias represented values to be closer to the standard than was the unbiased estimate (top portion of Figure 2). For example, if Morgan's unbiased estimate of her running speed is 3 seconds faster than Emily's speed (e.g. Emily's speed is 15.5 seconds, so Morgan estimates her speed to be 12.5 seconds), and she compares their speeds using "faster" (which has a CSD of 1.5 seconds), she will tend to adjust the estimate of her speed to be slower (closer to Emily's speed). Conversely, if the unbiased

1. A mathematical model describing how CID affects recall, judgments and estimates is presented in Choplin and Hummel (2005) and Choplin (2007).

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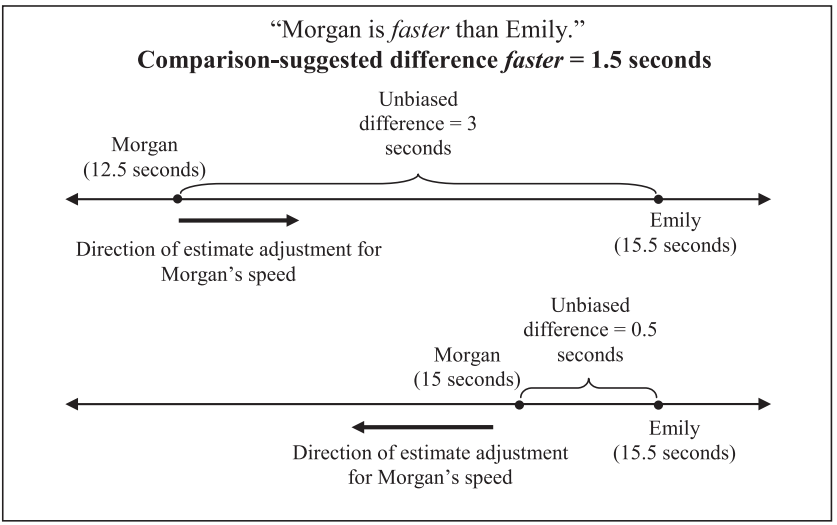


Figure 2. *Predictions for the direction of comparison-induced distortion for unbiased differences that exceed the comparison-suggested difference and fall below the CSD.*

difference is *less* than the CSD, the represented value will be biased to be further from the standard (bottom portion of Figure 2). If the unbiased estimate is *exactly* a CSD away from the comparison standard, the second estimate will be unchanged by the comparison (Choplin and Hummel 2002).

2. Preliminary studies

Two preliminary studies were conducted to investigate the potential of comparison language to affect how social comparison changes estimates of personal attribute values. In these studies, the comparison situation was designed to create either a contrast effect or an assimilation effect through presenting an initial difference between the standard's value and the participant's value that fell below the comparison-suggested difference in the first case and exceeded the CSD in the second. Further, the size of the CSD was manipulated by altering the comparison language used to make the comparison with the standard.

In the first study, participants were asked how many sit-ups they thought they could perform. After participants provided this information, the experimenter informed them that the comparison standard (Roseanne Barr, a television personality not known for athletic prowess) could perform two fewer sit-ups than their initial estimate. The experimenter then introduced a comparison-suggested difference by asserting that, surely, the participant could do "a few more" or "many more" sit-ups than Ms. Barr (comparison language varied

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between subjects) and asked for a second estimate. Pre-testing with a separate group of participants had revealed that the CSD for the first comparison phrase was 23% more than the standard's number of sit-ups, and the CSD for the latter phrase was 111% more. The initial difference of 2 more sit-ups fell below the CSD for both comparison phrases for all participants. As predicted, participants who heard the comparison phrase with the smaller CSD ("a few more") provided a second estimate that was closer to the standard value ($M = 35.33$ more sit-ups than the standard value) than did those who heard the phrase with the larger CSD ("many more") ($M = 69.17$ higher than the standard value, $t(58) = 2.14$, $p < .05$). These results indicate that participants will show contrast effects following a social comparison when the initial difference between their estimate and the standard is less than the CSD, and the degree of contrast will be more extreme for comparison language implying a larger CSD.

A second preliminary study investigated the effects of comparison language on assimilation following a social comparison. Participants in this study were asked to estimate the number of advertisements they viewed on the average day. After providing this estimate, the experimenter told them that the average American viewed 3,000 advertisements every day and suggested that the participant may have seen "a few less" (found to imply a median CSD of 1250 fewer ads in pre-testing) or "a lot less" (found to imply a median CSD of 2700 fewer). Participants were then asked for a second estimate. The average first estimate made in both conditions ($M = 228.97$ for "a few less" and $M = 116.57$ for "a lot less;" $t = 1.37$, *ns*) was considerably smaller than the presented standard value of 3000 ads, so the initial difference exceeded the CSD in both comparison phrase conditions. Second estimates for participants who heard the smaller CSD phrase ("a few less") were closer to the standard value of 3000 ($M = 1513.17$) than were those for participants who heard the larger CSD phrase ("a lot less") ($M = 655.17$, $t(58) = 3.361$, $p < .01$). The results of this preliminary study show that participants will assimilate their personal estimates towards a standard when the initial difference between their estimate and the standard is larger than the CSD, and the degree of assimilation is affected by how small the relevant CSD is (i.e. a smaller CSD, depicting a smaller difference between the participant's estimate and the standard, produces a greater degree of assimilation).

The preliminary studies show that manipulating comparison language affects how people alter their estimates following social comparison. If the initial difference between compared values falls below the CSD for comparison language, contrast will occur, and the degree of contrast will depend on the size of the CSD (e.g. "a few more" versus "many more"). Similarly, if the initial difference exceeds the CSD for comparison language, assimilation will occur, and its extent will depend on the size of the CSD (e.g. "a few less" versus "a lot less").

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Comparison-Induced Distortion theory predicts that either assimilation or contrast patterns can arise from a participant assimilating her estimate towards the value that is a CSD from the standard (Choplin 2007). Thus, a particular comparison word or phrase, having a particular CSD, may lead to either assimilation or contrast depending on the size of the initial difference, which can be separately manipulated. This prediction is explored in Experiment 1. Further, while CID explains assimilation and contrast as arising from the comparison of numerical values, regardless of the particular characteristics of the comparison standard, it is possible that standard characteristics such as its similarity to the participant may influence the language used to make the comparison. If the comparison language people use to compare themselves to a standard is affected by their similarity to the standard, this should influence whether estimates assimilate or contrast away from the standard when the initial difference between the standard and the participant's value is held constant. This possibility is explored in Experiment 2. In Experiment 3, the effect of comparison-induced distortion on the *recall* of a set of personal attribute values is examined, to demonstrate that a given participant may show both assimilation and contrast effects within a set of attributes belonging to the same standard, depending on the initial difference between their attribute value and the comparison value.

3. Overview of Experiments 1 and 2

Previous research has found that people estimate themselves to be better than the average person on many tasks and attributes, particularly those that are perceived to be easy or common (*better-than-average effect*) (Alicke et al. 1995; Chambers and Windschitl 2004; Chambers et al. 2003; Svenson 1981; Windschitl et al. 2003). A topic area found to elicit the better-than-average effect, knowledge of driving rules (Windschitl et al. 2003), was used in Experiments 1 and 2 to influence the direction of difference most participants would expect to see between their own performance and that of a standard. Participants in both studies were offered a choice between "approximately the same" or "better" as the comparison phrase describing their anticipated performance relative to the standard. Pre-testing with a separate group of participants was used to establish the comparison-suggested difference for "better" in the domain of a driving rules test; the CSD for "approximately the same" was predicted to be 0, or no difference between the comparison standard and the participant's value. We predicted that participants selecting the comparison word "better" would have a larger CSD in mind than those choosing "approximately the same." In addition, based on previous findings of comparison-induced distortion (e.g. Choplin and Hummel 2002), we predicted that participants choosing either "better" or "approximately the same" would be sensitive to the size

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of the CSD for the selected comparison, and would alter their estimates of performance on the driving rules test to be either closer to the standard value when the initial difference was larger than the CSD, and further away from the standard value when the initial difference was smaller than the CSD.

4. Experiment 1

In Experiment 1, we investigated how social comparison to a standard differing from the unbiased estimate of performance by either a small (<CSD) or large (>CSD) amount affected second estimates of performance. The size of the initial difference between the participants' first estimate of their performance and the standard's performance on a test of driving rules was manipulated between subjects to exceed the CSD for "better" in one condition and fall below this CSD in the other condition. Past findings regarding the better-than-average effect (Windschitl et al. 2003) suggest that most participants would believe they would perform better than average on the test, and so should tend to choose "better" as their comparison phrase in both conditions. Their idea of what size of difference constitutes "better" (i.e. the CSD) was predicted to affect how they changed their estimate following comparison. It was thus predicted that participants would move their estimate away from the standard when the initial difference fell below the CSD and towards the standard when it exceeded the CSD. For those participants who chose "approximately the same" (predicted to be the minority), second estimates were predicted to be at or near the standard value, as the CSD for "approximately the same" should be 0.

4.1. *Method*

4.1.1. *Pre-testing.* Fifteen pre-test participants recruited in the Chicago metropolitan area were asked to estimate how many questions out of 50 they would answer correctly on a multiple choice test about driving rules in the state of Illinois. Participants then imagined that their performance was "better" than the average person taking the test, and stated the number of questions they believed the average person answered correctly in light of this information. The median percent difference between personal estimates and the estimate of the average person's performance was 17%. This indicates that the comparison-suggested difference for "better" in the context of performance on a test of driving rules is 17% more questions answered correctly than were answered correctly by the standard. Thus, the value that is a CSD from the standard for Experiments 1 and 2 is:

"better" = 1.17 * the standard
"approximately the same" = the standard

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These are the values participants choosing each comparison phrase were expected to adjust their estimates toward in Experiments 1 and 2.

4.1.2. *Participants.* The experimenter approached potential participants in the Chicago or Bloomington, IL area and asked them if they would like to participate. One-hundred eighteen people agreed to participate after being approached in this manner. The data of two participants were excluded due to experimenter error.

4.1.3. *Materials and procedure.* The experimenter randomly assigned participants to the small difference or large difference condition. Participants were first asked to estimate how many questions they would answer correctly on a 50-item multiple-choice test about driving rules in the state of Illinois. After providing this first estimate, participants were told the "average person's" performance on the test. Participants in the small difference condition heard a value that was 2 questions less than their own first estimate; those in the large difference condition heard a value 25% less than their first estimate. For example, a participant whose first estimate was 40 would have heard that the average person's score was 38 in the small difference condition and 30 in the large difference condition. A whole number, rather than a percentage, was used for the small difference condition to avoid a difference less than 1 question (which might not register as any difference at all). The value of 2 was 8% or less than the participants' first estimate for all but one participant in the small difference condition ($M = 5.2\%$, $SD = 1.8\%$), indicating that this difference size indeed constituted a smaller-than-CSD difference as intended (recall that the CSD for "better" was 17%).

After hearing the average person's performance level, participants were asked to choose whether they believed their performance on the test would be "approximately the same" or "better" than the average person's performance. After choosing one of the two phrases, participants were prompted to provide another estimate of their performance on the test. After providing this information, the participants were thanked and dismissed.

4.2. *Results and discussion*

Participants showed a slight tendency across conditions to choose "better" as the comparison (54%). This was not significantly different from 50% (by binomial test, $p > .20$). Contrary to our expectations and the results of past studies (Windschitl et al. 2003), participants did not show a better-than-average effect for performance on the test of driving rules. In fact, six participants opted to make their comparison with "worse," though this was not offered as an option (4 participants in the large difference condition, 2 in the small difference

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condition).[2] Choice of "approximately the same" versus "better" also did not differ significantly between the large and small difference conditions ($X^2(2, N = 116) = 1.31$, $p = .25$), suggesting that participants' language choice was not affected by the initial difference between their first estimate and the standard. The average first estimate of performance also did not differ between conditions (40.3 in the small difference, 40.6 in the large difference, $t(114) < 1$, *n.s.*).

Comparison information in both conditions was consistent with participants having superior performance to the standard, so if participants choosing "better" used the truth-conditional interpretation, there should be no reason to adjust their estimate in light of comparison information. However, in line with past research on comparison-induced distortion in numerical estimates (Choplin and Tawney 2005), we predicted that participants choosing "better" would tend to feel that their first estimate was too high when the average person's estimate was described as 25% lower, and adjust downward, and feel their first estimate was too low when the average person's was 2 fewer questions correct, and adjust upward. Participants choosing "approximately the same" in either condition should tend to adjust their estimate towards the comparison standard. Thus, overall patterns of estimate adjustment (across comparison choice) in the large difference condition should involve decreasing second estimates, while overall results in the small difference condition should involve increasing second estimates, though this pattern should be weaker due to participants who chose "approximately the same" decreasing their second estimate to be closer to the standard.

To evaluate these predictions, first estimates were subtracted from second estimates to calculate degree of adjustment. The gray bars on Figure 3 display the overall level of adjustment for the large and small difference conditions. Negative values indicate that second estimates were lower than first estimates. In the small difference condition, participants increased from their first estimate by an average of .64 questions correct; in the large difference condition, participants decreased from their first estimate by 1.94 questions correct, on average. The effect of condition on the difference between the first and second estimates was significant ($t(114) = -4.38$, $p < .001$): participants in the large difference condition, overall, decreased their performance estimate in light of comparison information ($t(56) = 3.65$, $p < .01$), while those in the small difference condition increased their estimate on average ($t(58) = -2.40$, $p < .05$).

2. One participant in the small difference condition also adjusted her final response to be lower than the average person's response, indicating that she believed she would do worse than average. Excluding this participant from analyses did not alter the pattern of results. The other five participants stating "worse" as their comparison did not move their second estimate to be lower than the standard.

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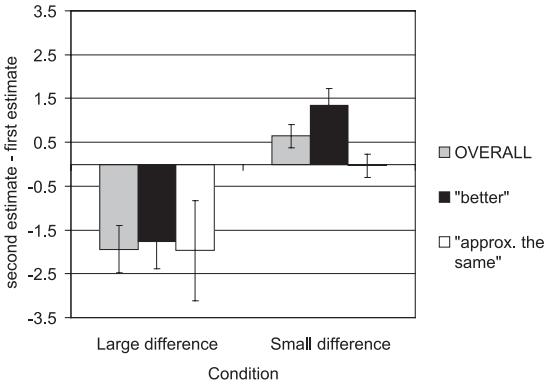


Figure 3. *Difference between second and first estimates of performance in Experiment 1 by difference condition and comparison phrase choice.*

Table 1. *Average difference between second estimates and first estimates (SD) for large and small difference conditions in Experiment 1 by comparison phrase choice.*

Condition	Comparison phrase selected		
	"Better"	"Approx. the same"	"Worse" [*no. of Ps*]
Large difference	−1.76 (3.64)	−1.97 (4.97)	−3.25 (1.89) [*4*]
Small difference	1.34 (2.02)	−0.04 (1.43)	0 (7.07) [*2*]

We also predicted that, because "better" and "approximately the same" have different CSDs, the participants choosing each comparison would adjust their estimates differently. Participants choosing "approximately the same" should move their estimate to be closer to the standard, regardless of the difference condition, and those choosing "better" should increase their estimate in the small difference condition and decrease it in the large difference condition. Figure 3 also displays the average adjustment by comparison choice ("better" or "approximately the same") for each condition, and Table 1 shows the average difference between second and first estimates for participants choosing "approximately the same" or "better" in each difference condition (average differences for "worse" are also shown for completeness). Participants in the small difference condition who chose "better" adjusted their second estimate up from their first by an average of 1.3 questions; those who chose "approximately the same" tended to not adjust their estimate (indicating that a 2-question difference might be within the range of "approximately the same"). In the large difference condition, participants who chose "better" adjusted down by an average of 1.76 questions and those who chose "approximately the same" ad-

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justed their second estimate down from the first by an average of 1.97 questions. The difference in adjustment between participants choosing "better" and those choosing "approximately the same" (or "worse") was significant in the small difference condition ($F(2, 56) = 3.57$, $p < .05$) but not in the large difference condition ($F(2, 54) = .24$, *n.s.*). The lack of a significant difference for the large difference condition may be because the CSD for both comparisons (17% for "better" and ~0 for "approximately the same") was smaller than the initial difference between the first estimate and the comparison standard (25%), so taking into account comparison information meant adjusting down towards the standard regardless of which phrase was selected. In contrast, the direction of adjustment predicted by CID in the small difference condition differed depending on the comparison chosen: adjustment up for "better" and adjustment down for "approximately the same," so any difference between participants choosing alternative phrases that arose from taking into account comparison information would be more apparent. However, because the comparison language participants used to compare themselves to the standard was not directly manipulated, any difference between participants selecting "approximately the same" and those choosing "better" in either condition must be interpreted with caution.

As predicted, participants who heard that their initial estimate was a large distance away from the average person's performance tended to give a lower second estimate and participants who heard that their first estimate was very close to the average person's performance tended to provide a higher second estimate. These results indicate that comparison with the same standard ("the average person") in the same experimental setting can result in either assimilation or contrast depending on the size of the initial difference between the participant's estimate and the standard's value. The pattern of adjustment also differed depending on the comparison chosen: participants who chose a phrase with a CSD smaller than the difference between their first estimate and the standard moved their second estimate towards the standard, while those who chose language with a larger CSD moved their second estimate further from the standard. While these latter results must be interpreted with caution, they suggest that a social comparison involving the same initial difference can result in *either* assimilation or contrast effects depending on how this initial difference measures up to the specific CSD for the comparison language applied.

A potential alternative explanation for Experiment 1's results that is important to discuss is that participants may have felt compelled by the experimental procedure to change their second answer from their first (i.e. a demand effect led to the adjustment). We cannot conclusively demonstrate that such a demand effect, rather than a change in beliefs about likely personal performance, was not at work in our results. However, the manner in which participants adjusted their estimates cannot be explained by a simple demand effect. Participants in the small difference condition could have adjusted their estimate towards the

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standard, but instead tended to adjust away when choosing "better;" those in the large difference condition could have adjusted their estimate to be further from the standard, but instead adjusted towards the standard when choosing "better." These results suggest that participants were sensitive to the difference implied by "better" and this guided their second responses. Further, the significant difference between pattern of adjustment for participants choosing "better" and those choosing "approximately the same" supports the idea that participants were sensitive to what the comparison language implied and were using this information to guide their second estimates. If the comparison information failed to change the participants' true perceptions of their performance, it at least led them to change their estimates in ways that can only be explained by an appreciation for the relevant comparison-suggested difference.

5. Experiment 2

The similarity of the standard to the self is one factor that is known to influence social comparison (Cash et al. 1983; Festinger 1954; Lockwood and Kunda 1997; Wood 1989). According to Festinger (1954), assimilation of one's own value to the standard's value is likely to occur when the standard is similar to oneself. Contrast may occur when the standard is dissimilar (Brown et al. 1992; Hoffman et al. 1954). This effect of standard similarity or dissimilarity on assimilation and contrast effects has been demonstrated in several studies (e.g. Brown et al. 1992; Byrne 1997; Cash et al. 1983; Hoffman et al. 1954; Miller and Suls 1977; Seta 1982; Seta et al. 1991).

The similarity of the standard may also influence the comparison language a person chooses to describe their relation to the standard. A more similar standard may prompt language implying less of a difference (e.g. "approximately the same") rather than language implying more of a difference (e.g. "better"), while a dissimilar standard may prompt language implying more of a difference rather than less. The results of Experiment 1 suggest that if comparison language is affected by standard similarity, the relevant CSD in the comparison will be affected, and this will influence participants' second estimates. In Experiment 2, we explored the mediating role of comparison language in how standard similarity affects assimilation and contrast effects.

5.1. *Method*

5.1.1. *Participants.* Participants were approached in the same geographic area and in the same manner as in Experiment 1. Ninety participants agreed to participate after being approached by the experimenter. The data of one participant was excluded due to experimenter error.

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5.1.2. *Materials and procedure.* The basic design of Experiment 2 was identical to that of Experiment 1 except for the identity of the comparison standard. Participants heard the performance value for either "the average Chicago, IL area resident" or "the average London, England area resident." Because participants currently resided in the Chicago area, "the average Chicago, IL area resident" was believed to be a more similar standard, while "the average London, England area resident" was predicted to be a dissimilar standard.

As in Experiment 1, participants estimated their own performance before hearing about the standard's value. After hearing the standard's value (4 fewer questions correct than their original estimate in both conditions), participants chose between "approximately the same" and "better" to compare their performance to that of the standard, then made a second estimate of their own performance. The difference of 4 was used so that both participants choosing "approximately the same" and those choosing "better" would be likely to adjust their second estimate from their first, in opposite directions (up towards the value a CSD away from the standard for "better," down towards the standard value for "approximately the same"). According to the first estimates provided in Experiment 1, 4 fewer questions correct will be less than the comparison-suggested difference for "better" for most participants. The average first response in Experiment 1 was ~40, making 4 questions only 10% of this value, smaller than the 17% CSD for "better." It should also be larger than the CSD for "approximately the same," which should be 0.

As a manipulation check, similarity ratings of the participant to the standard in terms of performance on the task were then collected on a 10-point scale with 1 = "not at all similar" and 10 = "completely similar."

5.2. *Results and discussion*

The manipulation check revealed a significant effect of standard version on similarity ratings ($t(87) = 5.447$, $p < .001$). As expected, the similar standard condition ("average Chicago, IL area resident") received higher similarity ratings on average ($M = 5.16$, SD = 2.48) than did the dissimilar standard ("average London, England area resident;" $M = 2.52$, SD = 2.06). The average first estimate was 38 questions correct in the *Chicago* condition and 36 questions correct in the London condition ($t(87) = 1.32$, *n.s*).

Figure 4 shows the average difference between second and first estimates by standard condition. The overall difference for each condition can be seen by examining the gray bars. Participants in the London condition adjusted their second estimate up from their first an average of 1.80 questions, while those in the Chicago condition adjusted their second estimate *down* from their first an average of 0.70 questions. Regressing the second estimate on the first estimate and standard condition revealed a significant effect of standard condition

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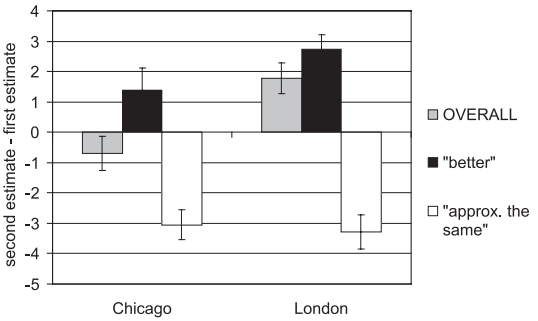


Figure 4. *Difference between second and first estimates of performance in Experiment 2 by standard condition and comparison phrase choice.*

($\beta = .145$, $t(86) = 2.93$, $p < .01$) and indicated that the two factors accounted for a significant portion of the variance ($R^2 = .794$, $F(2, 88) = 166.04$, $p < .01$). Thus, Experiment 2's results are consistent with past evidence showing assimilation responses for similar standards and contrast responses for dissimilar standards (Brown et al. 1992; Hoffman et al. 1954).

Though comparison language was not directly manipulated, the average difference between first and second estimates in both conditions was consistent with the comparison chosen ("better" or "approximately the same").[3] Participants who chose "better" made a higher second estimate (1.4 more questions in the Chicago condition, 2.7 more questions in the London condition). Participants who chose "approximately the same" made a lower second estimate (3.0 questions less in the Chicago condition and 3.3 less in the London condition). The pattern of adjustment following comparison was significantly different between participants choosing the two comparison phrases in the Chicago ($F(1, 43) = 23.17$, $p < .001$) and London conditions ($F(1, 42) = 28.79$, $p < .001$).

Figure 5 shows the proportion of comparison choices for the London and Chicago conditions. Choice of "better" predominated in the London condition, while a more even split between the two comparisons emerged in the Chicago condition. This difference in proportion of comparison choices between conditions was significant by logistic regression ($b = 1.53$, $SE = .509$, $p < .01$). This establishes a significant effect of standard condition on the comparison language selected by participants. To examine the extent to which choice of comparison mediated the effect of standard condition on the second estimate given the first estimate, we regressed the second estimate on the first estimate, com-

3. No participants in Experiment 2 offered "worse" as their comparison to the standard.

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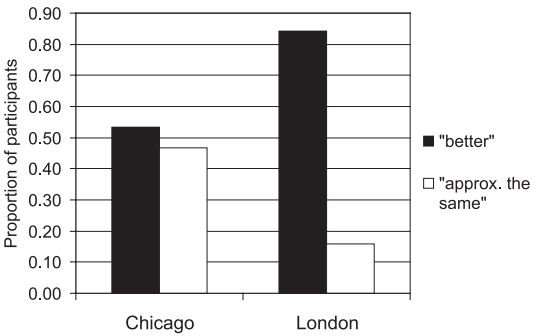


Figure 5. *Proportion of participants choosing each comparison phrase in Experiment 2.*

parison choice and standard condition, and found that the three factors accounted for a significant proportion of the variance in difference size ($R^2 = .880$, $F(3, 88) = 207.70$, $p < .001$). The effect of standard condition, however, was no longer significant ($t(85) = .93$, *n.s.*), while the effect for comparison language was ($\beta = .311$, $t(85) = 7.79$, $p < .001$). A Sobel test found that comparison choice significantly mediated the effect of standard condition on second estimates (*Sobel* = 2.84, $p < .01$).

The results of Experiment 2 indicate that similarity of the standard to the decision maker works at least part of its influence on assimilation and contrast effects through how it affects comparison language. Participants who estimated their own performance to be "approximately the same" as the standard moved their second estimate to be closer to the standard's performance level for both the similar (Chicago) and dissimilar (London) standards; those participants who chose "better" to compare themselves to the standard adjusted their estimate to be further from the standard, again for both a similar and dissimilar standard. A difference in proportion of participants choosing "approximately the same" to compare themselves to the standard between the Chicago and London conditions mediated the effect of standard on second estimates: participants choosing "approximately the same" were more likely to move their second estimate towards the comparison standard, and participants were more likely to choose "approximately the same" as the comparison phrase in the Chicago condition. Once the influence of this factor was accounted for, standard similarity no longer had a significant effect on second estimates.

Experiment 2 is open to the same potential role for demand effects as Experiment 1, with the additional possibility that participants in the London condition felt pressured to choose "better" rather than "approximately the same." Again, although this possibility cannot be ruled out, the way participants adjusted their estimates following choice of the comparison language suggests that they were sensitive to the comparison-suggested differences for "better"

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and "approximately the same." Further, those participants who chose "approximately the same" in the London condition, though fewer in number than those choosing this phrase in the Chicago condition, showed the same pattern in their responses. Similarly, participants in the Chicago condition who chose "better" adjusted the second estimate away from the standard like those participants choosing "better" in the London condition. Although standard condition may have encouraged more choices of one comparison phrase over the other due simply to demand effects, participants' subsequent responses indicate that they were sensitive to the quantitative differences implied by the comparison they had chosen.

6. Experiment 3

In contrast to some previous theories (e.g. Mussweiler 2003), CID theory predicts concurrent assimilation and contrast effects for the same participant comparing herself to the same standard. Experiment 3 examined this prediction. In this experiment, we used presented attribute values as unbiased values (as opposed to initial estimates of performance), recall of the presented values rather than revised estimates, and a within-subjects manipulation of the difference size between the self value and the standard's value. The within-subjects methodology provided an opportunity to explore comparison-induced distortion leading to concurrent assimilation and contrast effects for the same participant comparing herself to the same standard. CID theory predicts that a comparison with a standard can result in assimilation and contrast patterns within the target-standard pair as long as the difference between the participant's attribute and that of the standard is sometimes larger than the CSD for the comparison language and sometimes smaller. Further, participants were asked to recall values they had seen previously, giving them no obvious motivation to alter these values, and removing the potential role of demand effects in responses.

In Experiment 3, CID had the potential to affect both recall of the participant's attribute value and recall of the standard's value (i.e. participants recalled both their own values and those of the standard). Under these circumstances, CID theory (Choplin 2007; Choplin and Hummel 2002) predicts that the difference between the values will be recalled as closer to the comparison-suggested difference: the values will be recalled as closer together when initially separated by a difference larger than the CSD, and further apart when initially presented as closer together than this difference. In addition, CID should lead participants to recall their own values as further away from the standard's when the presented difference was <CSD, and as closer to the standard's when the presented difference was >CSD.

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6.1. *Method*

6.1.1. *Pretests.* The results of two pretests determined the attribute values presented to participants in Experiment 3. Participants for the pretests were recruited in a manner similar to Experiments 1 and 2 on a university campus in the city of Chicago, Illinois.

In the means pretest, 40 participants (20 males and 20 females) were asked to imagine the average student of their own sex at their university and to estimate that student's values for the six attributes used in this study: GPA, height, weight, annual income, dates per month, and distance (distance lived from campus). In the comparison-suggested difference pre-test, 77 participants (38 males and 39 females) were provided with the six average attribute values from the means pretest as the values for the average student at their university. They were then asked to imagine another person whose attribute values were better than the average person's values (that is, participants were told that the other person had a better GPA, was taller, weighed less [weighed more due to greater muscularity for males], earned more, got more dates, and lived closer to campus than the average person did). Participants provided an estimate of this other person's values for the six attributes. The estimates at the 10th and 90th percentiles were used for <CSD and >CSD best friend values in Experiment 3.

6.1.2. *Participants.* One-hundred and sixty participants (80 male, 80 female) were recruited in a manner similar to the previous experiments.

6.1.3. *Materials and procedure.* Participants read a paragraph asking them to imagine that they were an average student named Jennifer (Brad for males) who is jealous of a best friend named Michelle (Michael) who always seems to be "better" at everything and has nicer things. Participants read a set of sentences describing their values and their best friend's values for six attributes (GPA, height, weight, annual income, monthly dates, and nearness to campus, in that order). On the same page, participants were asked to indicate for each attribute whether they or their friend had a better value with language specific to the attribute involved (e.g. "Who is taller?" "Who has a better GPA?"). The correct response to these items was always that the friend or his/her possessions were superior.

Table 2 displays all information presented to participants in Experiment 3. In the scenario that participants read on the first page of the questionnaire, the values assigned to their imagined selves (i.e. Jennifer or Brad) were the same for each participant of a given sex. However, the values presented for the comparison standard (i.e. their best friend) differed from the participants' values by either a small (<CSD) or large (>CSD) amount. This factor was manipulated within-subject and counter-balanced. For half of the participants, the self-other

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Table 2. *Self and other values presented in Experiment 3.*

		Presented Self values	Presented <CSD friend values	Presented >CSD friend values
Women	GPA	3.17	3.2	3.8
	Height	64.375 in	65.66 in	68.66 in
	Weight	134.9 lbs	130.3 lbs	115.3 lbs
	Income	$7,868.09	$8,001.71	$10,001.71
	Dates	3.1/mo	3.94/mo	6.42/mo
	Distance	9.2 mi	8.15 mi	0.99 mi
Men	GPA	3.01	3.19	3.5
	Height	70.375 in	71.66 in	74.66 in
	Weight	173.6 lbs	180.2 lbs	214.2 lbs
	Income	$12,084.05	$13,001.07	$22,900.07
	Dates	2.45/mo	3.01/mo	5.01/mo
	Distance	18.9 mi	16.1 mi	.03 mi

differences for GPA, weight, and number of dates were less than a CSD, and those for height, income, and commute distance were greater than a CSD; for the other half of the participants, these differences were reversed.

After making the judgments about whose value was superior, participants completed a filler task to disrupt their short-term memory for the presented values. On the next page, participants recalled the six pairs of attribute values assigned to themselves and their best friend.

6.2. *Results and discussion*

The recalled values for distance lived from campus were missing data for one participant. In addition, the recalled yearly income values of three participants who recalled the self income value as higher than the best friend's value were eliminated.

If comparison-induced distortion affects recall of attribute values, then values presented as closer than a comparison-suggested difference should be recalled as further apart and values presented as further apart than a CSD should be recalled as closer together. To control for differences in scale across the attributes, recalled differences between self and best friend attribute values were coded as larger = 1, smaller = −1, or the same = 0 as observed differences. The coded values were then averaged across the three attributes presented with a <CSD difference and the three attributes presented with a >CSD difference. A paired-samples t-test indicated a significant effect of observed difference size, such that <CSD differences were recalled as *larger* than presented, while >CSD differences were recalled as *smaller* ($M = 0.26$ for <CSD attribute differences, $M = -0.45$ for >CSD attribute differences, $t(159) = 13.77$, $p < .001$). Ignoring recalled differences that were identical to the observed difference,

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binomial tests revealed that the majority of participants recalled differences as larger than presented when the observed difference was <CSD and as smaller than presented when the observed difference was >CSD for most attributes. For example, 79% of participants recalled greater disparity between their GPA and their best friend's GPA when the observed difference was less than a CSD, whereas only 13% recalled the difference as larger when the observed difference was more than a CSD. However, for two attributes (height and distance), participants tended to recall the difference between values as smaller than observed regardless of whether the observed difference was <CSD or >CSD. For height, because the two attribute values were expressed with a larger degree of precision than is typically used (70.375 inches), participants may have been more likely to round off the values while reading them (e.g. looking at the value of 70.375 and thinking "That's about 70.5 inches"), which would have brought the self value closer in mind to the best friend's value in both the <CSD and >CSD presentations. For the distance attribute, the self values for men and women may have seemed oddly large (many students live within walking-distance of campus), leading to a bias to recall these values as lower than presented for both the <CSD and >CSD conditions (in fact, 76% of participants recalled the self value as lower than presented for this attribute). Table 3 shows the proportion of participants recalling the difference between values as larger or smaller than presented, by CSD condition.

Table 3. *Proportion of participants recalling the difference between attribute values to be larger and smaller than presented for each attribute and each CSD condition.*

Attribute	Observed difference	Proportion recalling as larger[4]	Proportion recalling as smaller[5]	No. recalling difference as observed
GPA	<CSD	0.79*	0.21	18
	>CSD	0.13*	0.87	20
Height	<CSD	0.34*	0.66	1
	>CSD	0.25*	0.75	0
Weight	<CSD	0.75*	0.25	1
	>CSD	0.25*	0.75	2
Income	<CSD	0.97*	0.03	0
	>CSD	0.49	0.51	0
Dates	<CSD	0.70*	0.30	6
	>CSD	0.27*	0.73	2
Distance	<CSD	0.31*	0.69	0
	>CSD	0.16*	0.84	4

* significant by binomial test at $p < .01$

4. This proportion was calculated after excluding all responses recalling the difference accurately.
5. See footnote 4.

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Table 4. *Presented and recalled self values in Experiment 3 when the best friend's value was >CSD superior and when it was <CSD superior. For the attributes marked with an asterisk, higher values are worse than lower values.*

		Presented self values	Recalled self when best friend's value >CSD superior	Recalled self when best friend's value <CSD superior	Expected ordinal difference in recall between conditions
Women	GPA	*3.17*	3.19	3.14	Higher when >CSD
	Height	*64.375 in*	63.80 in	63.90 in	Higher when >CSD
	Weight*	*134.90 lbs*	133.30 lbs	135.91 lbs	Lower when >CSD
	Income	*$7868.09*	$7312.53	$7242.88	Higher when >CSD
	Dates	*3.1/mo*	3.32/mo	3.13/mo	Higher when >CSD
	Distance*	*9.2 mi*	8.57 mi	8.94 mi	Lower when >CSD
Men	GPA	*3.01*	3.06	3.03	Higher when >CSD
	Height	*70.375 in*	70.5 in	70.2 in	Higher when >CSD
	Weight	*173.60 lbs*	175.66 lbs	171.20 lbs	Higher when >CSD
	Income	*$12084.05*	$11862.00	$12011.23	Higher when >CSD
	Dates	*2.45/mo*	2.37/mo	2.30/mo	Higher when >CSD
	Distance*	*18.9 mi*	16.46 mi	18.19 mi	Lower when >CSD

Presented and recalled self values are shown in Table 4. To examine how comparison with a >CSD or <CSD superior attribute value influenced recall of self values, recalled values were divided by presented values to create a proportion.[6] These proportions were averaged separately for the three <CSD attributes and the three >CSD attributes for each participant.[7] A paired-samples t-test revealed that the proportion of recalled to presented self values was smaller for the <CSD attributes ($M = .99$) than for the >CSD attributes ($M = 1.05$; $t(159) = -2.28$, $p < .05$). For the <CSD attributes, the proportion of recalled self to presented self was not significantly smaller than 1 ($t(159) = -1.67$, $p = .10$). For the >CSD attributes, the proportion was significantly larger than 1 ($t(159) = 2.07$, $p < .05$). Participants tended to recall their own value as better (e.g. weight as lower for women and higher for men; income as higher) when the best friend's value was more than a CSD superior to their own than when it was less than a CSD superior.

The results of Experiment 3 demonstrate that comparison-induced distortion can produce concurrent assimilation and contrast effects for the same partici-

6. When lower values were superior to higher values (e.g. weight for women) the observed proportion was divided by the recalled value.
7. Unlike the proportion of difference-recalled to difference-observed, the proportion of self-recalled to self-observed was not as affected by differences in scale across the attributes, so it was possible to average across the three <CSD and the three >CSD proportions for each participant.

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pant comparing to the same standard in a within-subjects design. This indicates that it was the difference in size between the standard and target attribute values, and not beliefs about the standard, which led to assimilation and contrast effects. Further, as participants were asked to recall the presented values accurately, demand characteristics cannot explain the assimilation and contrast effects shown in Experiment 3.

Although participants read assigned self values in Experiment 3 rather than providing these values themselves, people often have attribute values which they can no longer accurately recall (e.g. SAT verbal scores, cholesterol levels). In these situations, hearing their value compared to a standard should influence recall of their own value in the manner demonstrated in Experiment 3. Further, recall of recently-learned information about personal attributes should also be open to comparison-induced distortion. For example, if participants are given a novel personality test and learn their scores, this is new information which should be unfamiliar enough that later recall of their own scores will be influenced by comparison with a standard's value.

7. General discussion

The assimilation and contrast effects described here are in line with the predictions of Comparison-Induced Distortion theory (Choplin 2007; Choplin and Hummel 2002) and are difficult to explain through current theories addressing social comparison effects. Experiment 1 found that estimates of personal ability were biased toward the value a CSD away from the standard: a large initial difference (>CSD for *better*) led participants to adjust their estimates towards the value of the standard, while a small initial difference (<CSD for *better*) led participants to adjust their estimates away from the value of the standard. Experiment 2 found assimilation [contrast] effects for a more similar [dissimilar] standard consistent with past research, but the effect was mediated by the language chosen to compare the self to the standard. These findings suggest that some effects of comparison standard on assimilation/contrast effects may be due to how standard similarity influences comparison language. Using a within-subjects design, Experiment 3 found concurrent assimilation and contrast effects in the recall of attribute values compared with the values of a particular standard: assimilation occurred when an attribute value was more than a CSD lower than the comparison value, while contrast occurred when the two values differed by less than a CSD.

Comparison-Induced Distortion theory explains both assimilation and contrast effects from social comparison through a single process: assimilation of the self value towards the value that is a comparison-suggested difference from the standard's value. However, there are several factors that ultimately determine whether this process will result in contrast or assimilation to the standard's

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value. First, the results presented here show that the same initial difference between the comparison standard and the participant's attribute can result in either assimilation or contrast depending on the comparison language used and its CSD (Experiment 2). To the extent that a comparison is made using language that implies a large difference, contrast effects may be more likely because the CSD will generally be larger than the initial, or unbiased, difference between values. Second, the same comparison language (i.e. the same CSD) can produce either contrast or assimilation effects depending on the initial difference between compared values (Experiment 1). This finding indicates that the result of a social comparison will tend to be assimilation when there is a large difference between initial values and tend to be contrast when there is a small difference, all other factors being equal. Finally, because the assimilation or contrast effects resulting from social comparison involve the numerical difference between pairs of attribute values, rather than a global assessment of how the self measures up to the standard, it is possible for a social comparison to result in assimilation for some values and contrast for others (Experiment 3). For this reason, it may be more appropriate to say that a person has assimilated/contrasted their *attribute value* to be closer to the value of the standard, rather than to say that the person has assimilated/contrasted to the standard itself.

7.1. *Relationship to other theories*

No other theory of social comparison can explain the effects of the above studies because no other theory takes into account the quantitative information presented by comparison language. However, some factors described by other theories may be influenced by the language used to make a comparison and the quantitative difference this language implies between the values. In addition, factors described by other theories may influence the language used to make a comparison. The factors discussed here include the way in which people use comparison information to understand a target (Schwarz and Bless 1992, 2007), the information about the self that is brought to mind by a comparison (Mussweiler 2001, 2003; Mussweiler and Strack 1999, 2000), and the context in which the target of a comparison is first evaluated (Higgins and Lurie 1983; Higgins and Stangor 1988).

Schwarz and Bless (1992, 2007) found that when information about the context (i.e. the comparison standard) is integrated into the representation of the target of the comparison, assimilation effects tend to occur. For instance, if the target is *US politicians*, and participants are presented with the context *Richard Nixon*, characteristics of Richard Nixon will be included in the activated concept of US politicians, influencing judgments of how trustworthy politicians in the US are (Schwarz and Bless 1992). Alternatively, contrast effects can occur when information about the context is not or cannot be included in the repre-

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sentation of the target, such as when the target category and the context are on the same categorical level. If the target is *Bill Clinton*, the representation of the category of Bill Clinton cannot be made to include characteristics of the context Richard Nixon; instead, Nixon will be used as a standard against which to evaluate Clinton's trustworthiness, leading Clinton to be viewed as more trustworthy in the context of Nixon (Schwarz and Bless 1992). Thus, the Inclusion-Exclusion Model draws on how the representations of the standard and target are constructed to explain contrast and assimilation effects (Schwarz and Bless 2007).

Regardless of whether a standard can be included in a presented category (e.g. US politicians in the context of Richard Nixon) or is used as a standard by which to judge a target (e.g. Bill Clinton in the context of Richard Nixon), CID theory predicts that the result of the comparison will be affected by the pre-comparison difference in their attribute values. In those cases where the target's representation cannot incorporate the standard, as in the Nixon/Clinton example (Schwarz and Bless 1992), contrast would be likely if the difference between the pre-comparison assessments of trustworthiness for the two politicians were separated by a difference smaller than that suggested by the implicit comparison (e.g. *Nixon is more untrustworthy than Clinton*). Were the pre-comparison difference in trustworthiness judgments for the two men increased (e.g. if Carter were compared with Nixon), assimilation towards the standard might then occur. For the Nixon/US politicians comparison, because Nixon represents an extreme point along the trustworthiness dimension, judgments of Nixon's trustworthiness would likely be separated from the pre-comparison view of the typical US politician by more than the difference suggested by implicit comparison (e.g. *Nixon is more untrustworthy than the typical US politician*). In this case, bias from the implied difference pulls the judgment of US politicians towards the judgment for Nixon. Were the difference between pre-comparison judgments not so great (e.g. if Lyndon B. Johnson were the standard), the judgment for US politicians made in the comparison context might be pushed away from the judgment for the standard, leading to a contrast effect.

Decisions about category membership, such as those described by the Inclusion-Exclusion Model (Schwarz and Bless 1992, 2007), may themselves affect the language applied in making a comparison. People may be more likely to use equivalency language (e.g. "approximately the same") to compare a target and standard perceived to be in the same category (Nixon/US politicians), and language implying a larger difference (e.g. "more untrustworthy") when the standard is not included in the target's category (Nixon/Clinton). If this is the case, decisions about including a standard in the target's category will likely influence how much the standard and target are expected to differ (i.e. the relevant CSD), and impact assimilation and contrast through CID processes.

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Mussweiler and his colleagues (Mussweiler 2001, 2003; Mussweiler and Strack 1999, 2000) have found that comparisons with others either selectively activate information about how the self is similar to the comparison standard or different from the standard depending upon the hypothesis that is tested (Mussweiler 2003). Thus, the act of comparison on a particular attribute, such as athletic ability, may make knowledge about how oneself is similar to the standard in terms of athletic ability more accessible, and lead to assessments of one's own athletic ability that are similar to that of the standard (assimilation). Conversely, Mussweiler (2001; Mussweiler et al. 2004) described accessing information about how one is *unlike* the standard may lead a person to estimate her personal attribute level as further away from the level given for the standard (contrast). The tendency to test either hypothesis (similarity or dissimilarity of the self to the standard) may even be primed by an unrelated task (Mussweiler 2001).

The current results suggest that comparison language is likely to be integral to the processes described by Mussweiler and his colleagues. If people test the hypothesis that they are similar to a standard (e.g. because they had been primed by an unrelated task to focus on similarities rather than differences, as in Mussweiler 2001), they will be more likely to describe their attributes as "approximately the same" as the standard's attributes. As demonstrated in Experiment 2, this choice of comparison language biases a participant's estimates of her own attribute to be closer to the standard. Conversely, Experiment 2 showed that a standard which participants viewed as dissimilar prompted the use of comparison language suggesting a larger difference between themselves and the standard. This use of comparison language biased personal ability judgments away from the standard. Thus, focusing on how the standard and the self are dissimilar should lead to using comparison language suggesting larger differences and evaluation of personal attributes as being further away from those of the standard. Further, comparison language may itself act as a prime for the focus of a comparison, where more extreme comparison language (e.g. "much better") used to contrast one pair of attributes for the target and standard leads to a global focus on dissimilarities rather than similarities that influences how other attributes are compared.

The processes involved in CID are also relevant to the *change-of-standard* effect, which describes how relative differences in one context can influence recall in another context (Higgins and Lurie 1983; Higgins and Stangor 1988). Higgins and colleagues (Higgins and Lurie 1983; Higgins and Stangor 1988) found the assignment of a comparative label to a target on one occasion affected later judgments and recall of target information: a judge described as *moderately harsh* in a set of other judges was later recalled as assigning a longer average sentence when the recall context included judges who assigned longer average sentences. Higgins and Stangor (1988) argued that the com-

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parative judgment was made based on a category norm for the initial set of judges, and recall was based on this judgment and the norm for the set of judges presented at recall. CID expands on the change-of-standard effect by emphasizing that comparative labels provide not just information about qualitative differences, but their own quantitative information. In this view, when participants assign a comparative judgment (e.g. "moderately harsh") to a target in a given context, they are capturing the quantitative difference between the target and the category norm. Thus, when the label is applied in a different context, the quantitative information it conveys can combine with new context information to bias recall of the target information. If a judge is deemed moderately harsh in the context of one group of judges, the comparison-suggested difference for this phrase will bias recall of his average sentence length to be higher than the average sentence lengths for other judges provided at recall. Were he deemed "extremely harsh" in the first context, recalled average sentence length would be distorted to be even higher than the average of the recall context.

8. Conclusion

Comparison-induced distortion arises from expectations for how different two contrasted values will be based on the magnitude of difference implied by the comparison language (i.e. the comparison-suggested difference). Through CID, both assimilation and contrast patterns can be explained because of responses being biased towards a value that is a CSD from the standard. The findings described here cannot be explained by other theories of social comparison because these theories do not account for how comparison language, in particular, influences responses following a social comparison. However, CID processes may be influenced by factors described in other theories of social comparison (e.g. a focus on similarities or dissimilarities between the self and the standard, or shared category membership for the standard and target) if these factors affect the language people use to compare values.

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