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The primacy of self-referent information in perceptions of social consensus

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People's own responses to a social stimulus (i.e. whether they endorse it or reject it) predict how they expect other people to respond (consensus estimates). This correlation has long been accepted as evidence for social projection. There has been little direct evidence, however, for the assumption that self-referent judgments shape judgments about others. Supporting the projection model, Expt 1 shows that self-referent information is more accessible than consensus estimates. Once they have been made, people's own endorsements and rejections of a stimulus facilitate consensus estimates. In turn, consensus estimates facilitate endorsements (but less so). Judgments about the physical properties of the stimulus facilitate neither type of social judgment. Supporting the view that projection is egocentric, Expt 2 shows that, when making consensus estimates, people rely more on their own endorsements than on the endorsements made by another individual. This self–other difference does not depend on whose endorsements are revealed first or on whether the other person is anonymous or individuated.

Will the public support military action against the foreign tyrant? Will the dinner guests prefer Chablis or Chardonnay? Such questions, from the momentous to the mundane, need answers. The preferences of others must be known if social adjustment is to be effective. For the big questions, people can look to the survey industry; for the small questions, they must use their own judgment. In either case, people confidently predict the preferences of others. Mostly, they do this by expecting their own preferences to be common. A Chardonnay lover will not serve Chablis, not necessarily because he or she denigrates his or her guests' tastes, but because he or she expects the guests to share his or her own tastes. This expectation, whether right or wrong, is the result of projection.

Since Katz and Allport (1931) first demonstrated social projection in beliefs about the prevalence of cheating on exams, the association between people's own responses to a stimulus (endorsements) and their predictions of how others will respond (consensus estimates) has been replicated many times (see Gross & Miller, 1997; Krueger, 1998a, 2000; Krueger & Clement, 1997, for reviews). Although most of these findings are correlational, investigators tend to assume that people make high consensus estimates for stimuli they endorse *because* they endorse them, and that they make low estimates for stimuli they reject *because* they reject them. The term

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'projection' itself suggests this route of influence. If consensus estimates were thought to determine endorsements, the correlation would be called 'introjection'.

Projection vs. introjection

In studies on consensus estimation, the findings are usually presented in a manner that presupposes the truth of the projection model. In the famous sandwich board study (Ross, Greene, & House, 1977, Study 3), for example, students were asked whether they would help spread a curious message (either 'Repent!' or 'Eat at Joe's') on campus. The reported finding was that those students who complied with the request ($N = 54$) estimated compliance to be more common ($M = 61.4\%$) than did those who refused ($N = 50$, $M = 30.4\%$). In other words, participants' own responses (endorsements vs. rejections) were treated as the predictor variable, while consensus estimates were treated as the outcome variable. Because endorsements were not manipulated, however, they could only be considered a status variable, and no causal inferences could be drawn from their association with consensus estimates.

The same data can be analysed and presented in a manner that presupposes the introjection model. In this case, consensus estimates are treated as the predictor variable and endorsements as the outcome variable. Participants can be grouped depending on whether their consensus estimates for compliance are above or below 50%. Then, the percentage of endorsements (i.e. own compliance decision) can be computed separately for the high and the low estimators. When this is done for the sandwich board study, it appears that 81% of the high estimators complied with the experimenter, whereas only 28% of the low estimators complied. Given this analysis, it is tempting to conclude that high estimators decided to comply because of their perceptions of high consensus, and that low estimators yielded to their perceptions of an uncooperative group norm. Table 1 presents the association between endorsements and consensus estimates by giving the frequencies of the four possible combinations of own responses (endorsement vs. rejection) and consensus estimates (high vs. low).[1] The frequency format reveals that the correlation between

[1] In addition to a test statistic ($F = 56.2$), Ross *et al*. (1977, Table 4, p. 292) provided information on sample size and the mean consensus estimates (compliers: $N = 54$, $M = 61.4\%$; refusers: $N = 50$, $M = 30.4\%$). From this information, the joint frequencies of endorsement vs. rejection and high vs. low consensus estimates were computed in three steps. First, the t value was calculated as the square root of the F value ($t = 7.50$). Secondly, the standard deviation of the consensus estimates was assumed to be the same among the compliers and the refusers. Because

$$t = \frac{M_1 - M_2}{\sqrt{s^2\left(\frac{1}{N_1} \frac{1}{N_2}\right)}}$$

the standard deviation could be calculated as

$$s = \frac{M_1 - M_2}{t\sqrt{\frac{1}{N_1} + \frac{1}{N_2}}}$$

(McNemar, 1969, p. 115). This method yielded a within-group standard deviation of 21.07%. Thirdly, the mean consensus estimates for each group were standardized, and the z scores for a consensus estimate of 50% was calculated for the compliers ($z = -.54$) and the refusers ($z = .93$). The cumulative probability values (p) of these z scores and their complements ($1 - p$) were then transformed into the frequencies, which are displayed in Table 1. For example, it was estimated that 16 participants who complied with the request made low consensus estimates. This frequency represents 30% of the 54 compliers.

Table 1. Joint frequencies of own responses (endorsements vs. rejections) and consensus estimates (high vs. low) after Ross *et al*. (1977, Table 4, p. 292)

	Own response	
Consensus estimate	No (rejection)	Yes (endorsement)
Low	41	16
High	9	38

Note. The association between endorsements and consensus estimates is significant ($\chi^2(1,104) = 28.75$, $p < .001$, $\phi = .53$).

endorsements and consensus estimates can be read to suggest either projection or introjection.

To overcome the limitations of correlational designs, investigators have devised a variety of more sensitive methods. One way to test the presumed causal effect of self-referent information on consensus estimates is to manipulate item endorsements experimentally and to observe their association with subsequent consensus estimates (Agostinelli, Sherman, Presson, & Chassin, 1992; Cadinu & Rothbart, 1996; Krueger & Clement, 1996). Participants may learn, for example, about a quality they did not know they had (e.g. being able to distinguish bona fide from false suicide notes). Projection is indicated by the finding that those participants who are led to believe that they have the quality think it is more prevalent than those who are led to believe that they themselves do not have it. It is thus possible to create projection experimentally by demonstrating that participants' own endorsements and rejections of a stimulus item are *sufficient* to generate high and low consensus estimates, respectively. It is also clear, however, that these findings do not establish a universal causal relationship. Some of the correlations between endorsements and consensus estimates that are observed in non-experimental studies may conceivably result from introjection. It remains possible, for example, that students in the classic study complied with the experimenter because they perceived the willingness to carry the sandwich board to be common in the group.

A second approach to the study of causation involves tracking of endorsements and consensus estimates over time. Granberg and Brent (1983), for example, studied the link between political preferences (i.e. endorsements) and expectations concerning the outcome of presidential elections (i.e. consensus estimates). Consistent with projection, preferences at Time 1 predicted expectations at Time 2 when preferences at Time 2 were controlled. In contrast, expectations at Time 1 did not predict preferences at Time 2 when expectations at Time 2 were controlled, indicating that there was no evidence for a 'bandwagon effect' (i.e. introjection). Similar findings emerged in studies on the self-reports and social predictions concerning the use of recreational substances (Bauman & Ennett, 1996; Marks, Graham, & Hansen, 1992).

To further test the causal assumption underlying the projection model, the present authors turn to measures of response latency and response facilitation (e.g. Neely, 1977). They propose that a person's own stimulus endorsements are more accessible

than his or her consensus estimates. Because of that, it is suggested, it is likely that stimulus endorsements and rejections facilitate the construction of high and low consensus estimates, respectively. This facilitation is seen as a key mechanism underlying projection.

The egocentricity of projection

The causal process question which most research has addressed to date is whether various cognitive (e.g. the availability of the endorsements) or motivational (e.g. ego-defence) factors can increase the strength of projection. Although most of these factors are sufficient to increase the correlation between endorsements and consensus estimates, none of them appears to be necessary (see Krueger, 1998a, for a factor-by-factor review). A study investigating the role of response salience may illustrate this point. Marks and Duval (1991) asked their participants to choose between recreational activities (e.g. going to the movies or going to the beach). Then, some participants thought about their activity of choice, while others either thought about the alternative activity that they had rejected, or they thought about neither activity. Projection increased when the salience of the chosen activity was enhanced, but it did not disappear when the salience manipulation favoured the rejected alternative. In other words, participants who preferred to go to the movies still felt that most others would concur with this cineastic choice even if they had just visualized themselves lying on the beach.

This robustness of projection suggests that a partially automatic process is at work (Krueger, in press). Projection may occur simply because people perceive their own responses to a stimulus as part of perceiving the stimulus itself. Sipping ceremonial wine, for example, triggers a sensation of sweetness and an appreciation of its ritual meaning. Both, the physical sensation (of sweetness) and the social perception (of ceremonial meaning) are subjective experiences, and thus they are fairly direct. These experiences do not require knowledge of whether other celebrants sense the same sweetness or attribute the same meaning to the occasion. However, the experiences of others can be inferred from one's own experiences. This inference process implies a specific temporal order of endorsements and consensus estimates. If the correlation between endorsements and consensus estimates arises from projection, the perception of social consensus must follow—and cannot precede—the perception of one's own response.

This reasoning evokes Hume's law of causal precedence. Kelley (1971) accepted this law as a foundation of commonsense causal attribution. Attributions of causality, he noted, rest on the assumption that 'the effect must not, of course, precede a possible cause if that cause is to be perceived as the effective one' (p. 151). Formal experimental methods are no different in this respect. Independent variables are manipulated before dependent variables are measured. Causation can only be inferred because of this temporal order (Holland, 1993).[2]

[2] The present authors are not taking a position on whether causation is the cement of the universe (Mackie, 1974) or a quaint mistaken notion backed only by a web of conditional probabilities (Russell, 1918). The authors treat the idea of causation as a convenient premise for their work, much like social perceivers do in everyday life (Heider, 1958) and experimental psychologists do in the laboratory (Aronson, Eilson, & Brewer, 1998).

The accessibility hypothesis. This study examines the idea that response latencies are shorter for endorsements than for consensus estimates. To be sure, such a difference—if found—would not prove that endorsements cause consensus estimates. It would, however, render the opposite causal route improbable. If endorsements are indeed more accessible than consensus estimates, it seems likely that people construct consensus estimates on the basis of these endorsements. It would be difficult to claim that people derive their own endorsements from social consensus as they perceive it.

A possible concern about the accessibility hypothesis is that it *has* to be true. If so, there would be no need to test it. Consider the response to the physical stimulus in the wine-sipping scenario. Here, the sipper's own sensation of sweetness is immediate and automatic. In contrast, the sensations of others cannot be directly experienced. These experiences need to be inferred. The difference between subjective experience and the inferred experiences of others is less clear, however, in the perceptions of the social significance of the tasting. These perceptions are more cognitive in nature. Both one's own response and the presumed responses of others may be accessed or constructed only upon request. The appreciation of the symbolic meaning of a social stimulus in particular may require some reflection. It is important to note that most research on projection involves such ambiguous social stimuli (e.g. requests for compliance). In other words, most studies of social projection examine the correlation between endorsements and consensus estimates in a stimulus domain in which introjection offers a viable, though uncertain, alternative interpretation.

If responding to social stimuli requires some reflection, these responses may take longer than responses to physical stimuli. The accessibility hypothesis is modified to take this possibility into account: response latencies for endorsements will be longer than latencies for purely perceptual judgments (e.g. deciding whether a stimulus word contains a certain letter), but they will still be shorter than latencies for consensus estimates.

The association hypothesis. Projection not only suggests that endorsements are more accessible than consensus estimates, but also that an associative link (i.e. a correlation) is formed between these two variables. If, indeed, endorsements play a role in shaping consensus estimates, they may bring these estimates to mind. Thus, the association hypothesis states that the explicit expression of one's endorsements facilitates the expression of consensus estimates. If people have already expressed their own responses to the stimulus, they have done most of the necessary mental work. In contrast, when they are asked to make consensus estimates without first expressing their own responses, their work may be more difficult and time-consuming. Indeed, some of the work necessary for the construction of consensus estimates is gaining access to their own endorsement first.

If one's own endorsements need to be implicitly recruited before consensus estimates can be made, subsequent explicit endorsements may also be facilitated. Recently, Dunning and Hayes (1996) had participants make self-referent judgments (e.g. 'Are you late to class less than or more than two times per week?'—p. 220) *after* they had made a social judgment about a related trait (e.g. rating the punctuality of a fictitious student) or an unrelated trait (e.g. rating athleticism). As expected, participants expressed self-referent knowledge faster when they had first rated

another person on the same, rather than a different, trait. From this, Dunning and Hayes concluded that self-referent knowledge was spontaneously activated when a judgment about the other person was made. Consistent with this view, judgments about an acquaintance were not facilitated by judgments about an unfamiliar other.[3]

A test of response facilitation, as predicted by the association hypothesis, requires a control of practice effects that might arise from the mere repeated presentation of the stimulus. Suppose participants provided only endorsements and consensus estimates. When consensus estimates follow endorsements, the latencies for these estimates may be shorter simply because people respond to a stimulus faster when they see it a second time. To control this possible confound with practice, a third judgment of the stimulus is necessary which does not involve self-reference (e.g. a judgment that requires the person to examine surface characteristics of the stimulus). The association hypothesis states that self-referent endorsements facilitate subsequent consensus estimates more than perceptual control judgments (i.e. the Dunning effect). This hypothesis also states that consensus estimates facilitate endorsements more than control judgments. It is not possible to predict whether the two expected facilitation effects will be of the same magnitude. Because, however, endorsements are expected to be faster overall than consensus estimates (i.e. the accessibility hypothesis), both types of facilitation would lend greater support to the projection model than to the introjection model.

Pilot study

Before the experiment proper, a preliminary test of the accessibility hypothesis was conducted with 35 volunteers. For each of 24 trait adjectives, participants provided their own endorsements and consensus estimates (both as categorical judgments). The two types of responses were requested in unpredictable order. The average correlation between endorsements and consensus was reliably positive (mean $\phi = .16$, $SD(Z) = .39$; $t(34) = 2.43$, $p = .04$). Consistent with the accessibility hypothesis, participants made endorsements faster ($M = 3090$ ms, $SD = 1700$) than consensus estimates ($M = 4266$ ms, $SD = 2244$; $F(1,34) = 36.47$, $d = .57$). They also reported greater confidence in their endorsements ($Ms = 5.29$ vs. 4.66, on a 7-point scale; $F(1,34) = 47.92$, $d = .84$), and less difficulty in making them ($Ms = 2.74$ vs. 3.46; $F(1,34) = 54.44$, $d = .76$). These findings are consistent with previous research (Biernat, Manis, & Kobrynowicz, 1997; Kuiper & Rogers, 1979), and they encouraged the present authors to conduct the following, more sensitive experiment on response facilitation.

[3] Dunning and Hayes (1996) found a *negative* correlation between ratings of the self and ratings of another person (see also Dunning & Cohen, 1992). Because this contrast effect appears to be inconsistent with projection, which is assimilative, it is tempting to conclude that self-referent information may lead to opposite biases (Krueger, 1998b). A closer look at methodological differences dissolves this paradox. Assimilation effects (projection) emerge when little is known about the other person (or persons). In this case, people 'fill in' missing information by generalizing from themselves. When the properties of the other are specified, as in Dunning's paradigm, people evaluate these properties by comparing them to (and contrasting them away from) their own. The psychophysics of this shift follows readily from Parducci's (1965) range-frequency theory.

EXPERIMENT 1: RESPONSE FACILITATION

The accessibility hypothesis stated that endorsements are made faster than consensus estimates; the association hypothesis stated that endorsements speed up subsequent consensus estimates (and vice versa) more than perceptual control judgments. To test these hypotheses, participants were presented with person-descriptive words. They judged whether these words described them (endorsements), whether they described most people (consensus), and whether they contained the letter 's' (perceptual control). The use of multiple items permitted the measurement of projection for each participant individually. All judgments, including consensus estimates, were made as categorical decisions so that response latencies could be directly compared (see Dawes & Mulford, 1996, for a similar procedure).

The explicit order of endorsements and consensus estimates was not expected to affect the size of the correlation between these judgments (Krueger & Clement, 1994; Mullen *et al*., 1985), and there was no reason to believe that this correlation expresses projection when endorsements are made first, while expressing introjection when consensus estimates are made first.

Method

Participants and materials

Thirty-seven psychology students (64% female; mean age = 18.8 years) worked on personal computers which controlled stimulus presentation and data collection. A SuperLab 1.5.5 (Cedrus Corporation) program measured response latencies. The stimuli were 60 person-descriptive words (see Appendix A), ranging from highly positive (sincere) to highly negative (liar) at approximately equal intervals of social desirability (Anderson, 1968).

Procedures and design

Before seeing each word on the computer screen, participants were presented with one of three prompts: 'Does the trait contain the letter "s"?', 'Does the trait describe you?', or 'Does the trait describe most people?' The notations 'S?', 'YOU?' and 'PEOPLE?' represented the three questions during the experimental trials. Each trial began with a blank screen lasting for 2 s followed by one of the three judgment questions. After another 2 s, a trait term appeared and remained on the screen until the participant pressed one of the keys labeled 'Y' or 'N'. Participants were unaware that latencies were recorded.

Thus, the experiment had a 2 (time) × 3 (type of judgment: endorsement, consensus estimate, control) design in which participants served as their own controls (Fazio, 1990). For each trait, they responded to two of the three prompts on consecutive trials. Endorsements, consensus estimates and control judgments were paired in all six orders so that 10 traits were judged for each combination of prompts. The set of 10 traits to be judged in each combination was randomly determined for each particpant. The order of presentation was constrained so that the same combination of questions could not appear on consecutive trials.

Results

Preliminary analyses : projection

For each participant, projection was indexed by the correlation (ϕ) between endorsements and consensus estimates across the 40 traits for which the participant made both types of social judgments. On average (after ϕ-Z-ϕ transformation),

projection was reliable ($M = .24$, $SD(Z) = .40$; $t(36) = 3.65$, $p = .0008$). As expected, projection correlations emerged regardless of whether participants made endorsements or consensus estimates first ($t(36) = 1$).

Main analyses

Analytical strategy. Twelve latency scores were computed for each participant by averaging responses across items within each judgment type and time. To reduce the positive skew in the latency data, and to increase the power of inferential analyses, data were transformed in two ways: one method was to transform latencies from ms to common (base 10) logarithms; the other was to trim latencies lying more than 2.5 standard deviations above the mean (see Ratcliff, 1993, for a review of such methods). As expected, these analyses yielded nearly identical results, and therefore only the results from the log transforms are reported here. Differences in the significance levels between the two types of analysis are noted. Significance levels for F values above 10 have little incremental meaning, and are therefore omitted. All the F tests reported in this section have 1 degree of freedom in the numerator and 36 degrees of freedom in the denominator. Effect sizes are indicated by Cohen's d.

The averages of the log transforms were transformed back to msec and are displayed in Fig. 1. An omnibus 2 (time of judgment) × 3 (type of judgement: endorsements, consensus estimates, control) repeated measures analysis of variance (ANOVA) showed that judgments were faster when the trait appeared for the second time ($F = 463.95$, d = 1.29). More importantly, latencies varied with the type of

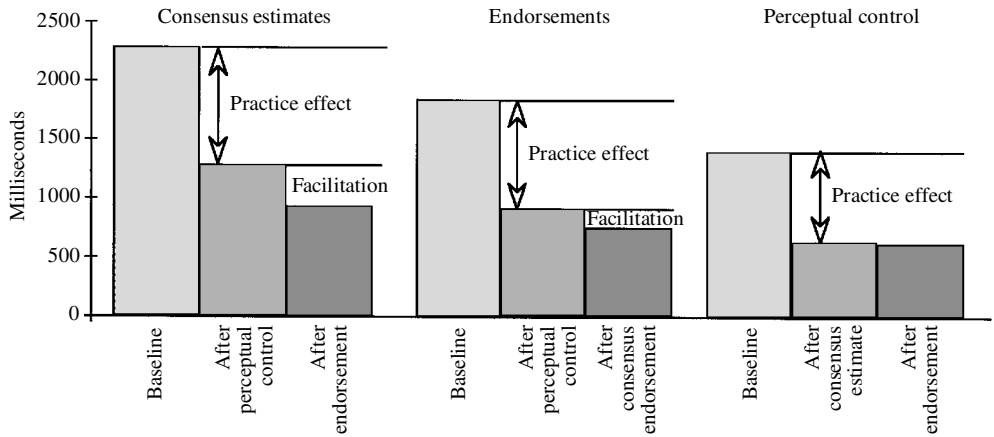

Figure 1. Mean response latencies (Expt 1).

judgment ($F = 91.44$, d = .88). This effect was not moderated by the time of judgment ($F = 1$).

Accessibility. The latencies of endorsements were compared with the latencies of consensus estimates. As expected, simple effects analyses showed that participants

made endorsements faster than consensus estimates at both Time 1 ($F = 98.58$, $d = .78$) and at Time 2 ($F = 41.26$, $d = .65$). Consistent with the idea that self-referent judgments require more reflection than perceptual judgments, latencies were shortest for the control judgments at both Time 1 ($F = 35.78$, $d = .66$) and Time 2 ($F = 23.72$, $d = .53$).

Association. The latencies for each of the three judgment types were submitted to separate 2 (time) × 2 (paired judgment type) repeated measures ANOVAs. Overall, consensus estimates were faster when paired with endorsements rather than with control judgments ($F = 18.38$, $d = .31$). Recall, however, that the association hypothesis predicted a specific pattern of response facilitation. At Time 2, those participants who had already made endorsements would make consensus estimates faster than those participants who had made control judgments first. The interaction with time suggested that this was the case ($F = 9.89$, $p = .003$). A simple effects analysis showed that consensus estimates were faster when following endorsements rather than control judgments ($F = 16.81$, $d = .58$).

It was also expected that consensus estimates (as opposed to control judgments) would facilitate endorsements. Overall, endorsements were faster when they were paired with consensus estimates than when they were paired with control judgments ($F = 5.90$, $p = .02$, $d = .17$). The interaction with time showed that consensus estimates facilitated endorsements more than control judgments ($F = 6.06$, $p = .02$). A simple effects analysis revealed that endorsements were faster when following consensus estimates than when following control judgments ($F = 8.04$, $p = .01$, $d = .44$).[4]

In sum, prior endorsements facilitated subsequent consensus estimates (by 355 ms as compared with control judgments), and there was a trend that consensus estimates facilitated endorsements less (by 143 ms; $t(36) = 1.39$, $p = .07$, one-tailed, $d = .32$). The association between endorsements and consensus estimates was exclusive. Control judgments only showed practice effects ($F = 318.95$, $d = 1.07$). They did not facilitate social judgments, nor were they were facilitated by them (Fs < 1).

Discussion

Participants made judgments about their own traits much faster than judgments about the traits of the majority (*accessibility*). Once made, these self-referent judgments facilitated judgments about others (as compared with control judgments) and they were facilitated by those judgments about others (*association*). This pattern of results supports the idea that people access their own stimulus endorsements implicitly when asked to make consensus estimates. This conclusion is consistent with the projection model, which states that people need to consider their own responses in order to construct estimates about how others will respond. The introjection model provides a poorer fit with the data. It is not plausible that people labour to construct consensus estimates and then, through backward causation, make their own endorsements.

Decisions on whether to endorse or reject a stimulus may be comparatively easy

[4] The interaction effect was not significant for the untransformed data (ms with outliers removed; $F = 1.67$). The simple effect was, however, significant ($F = 5.55$, $p = .025$, $d = .42$).

because they require little integration of different memory traces. When people decide, for example, whether they are sociable, they can call up relevant behavioural episodes from memory, all of which involve the self. In contrast, when deciding whether most people are sociable, they need to call up multiple episodes involving different people, including the self.[5] Although it is unclear whether people have access to more or fewer self-referent than other-referent memory traces, it seems likely that self-referent traces are more highly integrated. If so, the activation of any particular self-referent trace may lead to rapid activation of relevant other traces (Symons & Johnson, 1997).

Neuropsychological evidence suggests that self-reference is an integral part of most episodic memories. Consistent with the accessibility hypothesis, Canadian participants took less time to rate the descriptiveness of trait adjectives for the self than for a public figure (Prime Minister Brian Mulroney). As participants were rating the traits, their cortical activity was imaged by positron emission tomography (PET). Besides the striking similarities of activation, the PET also revealed specific self-related activations in the right prefrontal area. From this, the authors concluded 'that episodic retrieval necessarily involves the concept of the self' (Craik *et al*., 1999, p. 32).[6]

Whereas the goal of Expt 1 was to seek evidence that could discriminate between models of projection and models of introjection, Expt 2 was designed to examine predictions of three competing models of projection. The first question was whether people reason inductively or egocentrically when making consensus estimates. According to the *induction model*, projection is a legitimate inference strategy (Dawes, 1989). People are, after all, more likely to be in the majority than in the minority. When actual consensus is uncertain, people may use their own responses to a stimulus as samples of one and infer that most people respond as they themselves do. In the long run, this strategy guarantees estimation errors, but it minimizes their average size (Krueger, 1998a). Induction requires, however, that *any* sample of one be treated equally unless there is evidence of sample bias. When perceivers know another individual's response to a stimulus, they should recognize this response as being as informative for social consensus as their own response.

According to the *egocentrism model*, people do not reason inductively about social consensus. Instead, they grant privileged status to their own endorsements. They do this presumably because each endorsement tends to be rooted in converging layers of experience. Research on the automatic activation of (the self's) attitudes shows that even mundane preferences, be it for Apple computers or chocolate ice cream, can trigger relevant moods or memories (Bargh, Chaiken, Govender, & Pratto, 1992). In contrast, someone else's responses are likely to be singular pieces of information, stripped of the context in which they were formed and the emotional significance they hold. In some studies, perceivers knew about the responses of individual others,

[5] The attribution of causal significance to a temporal sequence must remain uncertain because causation cannot be observed. However, the accessibility advantage of self-referent information was large enough to permit the speculation that participants became aware of their own responses before they made consensus estimates (see Libet, 1985, on the half-second threshold for conscious experience).

[6] The eminent William James (1890) emphasized the necessity of self-reference in episodic memory: 'Memory requires more than mere dating of a fact in the past. It must be dated in *my* past. In other words, I must think that I directly experienced its occurrence' (Vol. 1, p. 650, emphasis in original).

but they hardly used them when predicting consensus (Alicke & Largo, 1995; Krueger & Clement, 1994). Although these findings supported the egocentrism model, they were limited in that an alternative explanation was not ruled out. It is possible that perceivers merely assign the greatest weight to whatever information appears first. As shown in Expt 1 above, self-referent information is highly accessible, which suggests that this information is already in place when people learn about the responses of other individuals. Thus, the high correlation between consensus estimates and the perceiver's own endorsements may simply indicate a primacy effect rather than egocentric projection.

How can information regarding the responses of other individuals ever enjoy temporal primacy over self-referent information? Whenever a stimulus is presented, self-referent information has the advantage of accessibility. To invert the typical temporal order of self- and other-referent information, Expt 2 included a condition in which information about the responses of another person was presented even before the stimulus itself. If self-referent information enjoys egocentric weight in consensus estimation simply because of its temporal primacy, consensus estimates should be predicted best by whatever information (self- or other-referent) is available first. If however, projection is egocentric, the order of self- and other-referent information does not matter.

The next question was: Who is the other person? Typically, that person is a 'bogus stranger', a fellow student identified only by a name or a number. According to the traditional *false-consensus model*, self-referent information is particularly available to the consensus estimator (Ross *et al*., 1977). In part, this availability may be mediated by the degree of individuation and familiarity. By and large, the self is more individuated than any other person simply because people have more self-referent than other-referent information (e.g. Krueger, Ham, & Linford, 1996). It seems unlikely that the other can ever be as individuated as the self, but the degree of individuation can be manipulated experimentally. Research on other egocentric biases shows that the magnitude of bias diminishes as other target people become more individuated—for example, comparisons with others become less self-enhancing when the other can be seen, even if it is merely by a rear view of that person's head (Alicke, Klotz, Breitenbecher, Yurak, & Vredenburg, 1995; Klar & Giladi, 1997). Thus, the traditional false-consensus model predicts that perceivers will give greater weight to the responses of an individuated person than to the responses of an anonymous person. The egocentrism model predicts no such difference.

EXPERIMENT 2: A SELF–OTHER ASYMMETRY

Three hypotheses were tested. The *self–other hypothesis* stated that people rely more heavily on their own responses to a stimulus than on the responses of other individuals when estimating social consensus. This hypothesis was derived from the egocentrism model of projection. Its rejection would support the induction model. The *primacy hypothesis* stated the self–other difference would be reversed when the responses of others precede the perceiver's own responses. This pattern, if found, would support the induction model. If, however, the same self–other difference

emerges regardless of the order of information, the egocentrism model would be supported. Finally, the *individuation hypothesis* stated that the self–other difference would be reduced when the other person is not an anonymous 'bogus stranger', but rather individuated by personal information. This hypothesis was derived from the false-consensus model. Its rejection would support the egocentrism model.

To maximize the potential effects of individuals' (self or other's) responses, and to minimize the effects of pre-existing stereotypes on consensus estimates, participants were assigned to arbitrarily created laboratory groups. In such 'minimal' groups, participants have no contact with other group members (except one) and little knowledge about the psychological or social meaning of the group label (Krueger & Clement, 1996). When stimulus items are presented, the only information available for consensus estimates are the perceiver's own endorsements and the endorsements of the other individual group member. This isolation of own and other's endorsements allows a comparison of their relative weight in predicting consensus estimates.

Participants were first presented either with the other person's endorsement or with the stimulus statement (see Fig. 2). When the other's endorsement preceded the stimulus, participants could not resort to their own responses as projective cues.

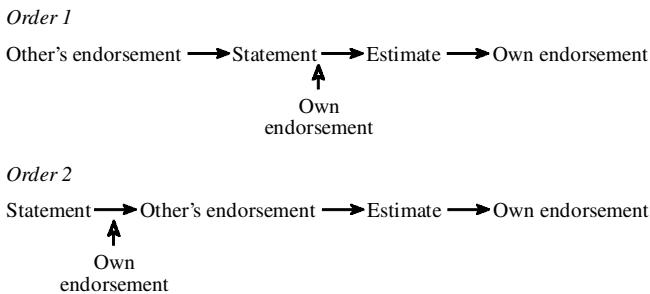

Figure 2. Design of Expt 2. Open font and arrows denote implicit activation and influence of particpant's own endorsements.

Thus, they might rely on the information they already have, namely the other's response. When the stimulus precedes the other's response, the participant's own response might already be implicitly in place by the time the other-referent information appears. The results of Expt 1 suggested this possibility. Therefore, it did not seem necessary to create a condition in which participants made their own endorsements before being informed about the other person's endorsement.

The other person was either anonymous (represented by a code number) or individuated (represented by a brief personal description). Incidental agreement between the participant and the other was controlled by the use of two patterns of the other's endorsements, one being the inverse of the other. Hence, the design was a 2 (order: other's endorsements first vs. items first) × 2 (anonymous vs. individuated other) factorial with two endorsement profiles as a control variable. Consensus estimates (in per cent) and endorsements (vs. rejections) of each item were the dependent measures.

Method

Participants and materials

Psychology students ($N = 142$, 64% female, mean age = 18.4) worked on personal computers, which controlled stimulus presentation and data collection through a HyperCard 2.2 (Apple) program. Assignment to an *ad hoc* group ('levellers') was accomplished by using and ostensibly scoring a modified 'Embedded Figures Test' (EFT; Witkin, 1950). The EFT was described as a method of assessing the 'leveling–sharpening dimension of cognitive style'. Projection to the in-group was assessed across 16 MMPI-2 statements. The statements, their MMPI rates of actual consensus, and the two profiles of the other in-group member's endorsements are displayed in Appendix B. Neither of the two profiles was correlated with actual consensus rates ($r = \pm .004$) as reported in the MMPI-2 manual (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989).

Procedures and design

On each of the 14 trials of the EFT, a simple figure was displayed at a random location on the computer screen for 3 s. This display was replaced by a screen of random dots for 2 s, and was followed by a display consisting of a complex figure in the centre. Participants traced the simple figure within the complex one with the computer's mouse.

When the EFT was completed, a spinning cursor feigned computer activity for 15 s, suggesting that test performance was being scored. All participants then learned that their performance identified them as 'levellers'. Following assignment, participants viewed information about a randomly drawn in-group member (other) who had previously participated in the same study. The description of the highly individuated other read:

> Keith (Karen) M. was drawn from the subject pool. He (She) is from upstate New York and entered Brown in the fall of 1993. Keith (Karen) M. took Psychology 3 last semester and will probably be a Psychology Concentrator. It was also determined that he (she) is a leveler.

To maximize participants' sensitivity to the other-referent information, the sex of the other always matched the participant's sex (see Reingen, 1982, for an example of the interrelations between similarity and consensus). The description of the anonymous other included only a five-digit 'subject identification number'.

For the projection stage of the experiment, participants were randomly assigned to one of two order conditions. For each MMPI statement in Order 1, the other's endorsement appeared on the computer screen for 3 s, followed by the stimulus item. Hence, the other's endorsement was known *before* one's own response was made. In Order 2, the stimulus item was presented for 3 s before the other's endorsement. In this case, rapid access of own endorsement was likely to occur before the other's endorsement appeared. In sum, the experiment had a 2 (order) × 2 (other: individuated vs. anonymous) factorial design. Participants' own endorsements and the endorsement profile of the other group member were treated as a within-participant factor. After learning the statement and the other's endorsements, participants made their consensus estimates in per cent, and then recorded their own endorsements.

Results and discussion

Pilot raters found it less difficult to form an impression of the individuated person ($M = 4.82$, SD = 2.68) than of the anonymous person ($M = 8.30$, SD = 1.57, on a 9-point scale; $t(19) = 3.59$, $p = .002$, d = 1.62). Preliminary analyses of the main data set showed that the differences between the two endorsement profiles did not modify the predicted effects. Thus, the reported findings are pooled across this variable.

To examine how much weight raters accorded their own and the other's endorsements, consensus estimates were regressed simultaneously onto own and the other's endorsements. The four mean beta weights (see Fig. 3) were greater than

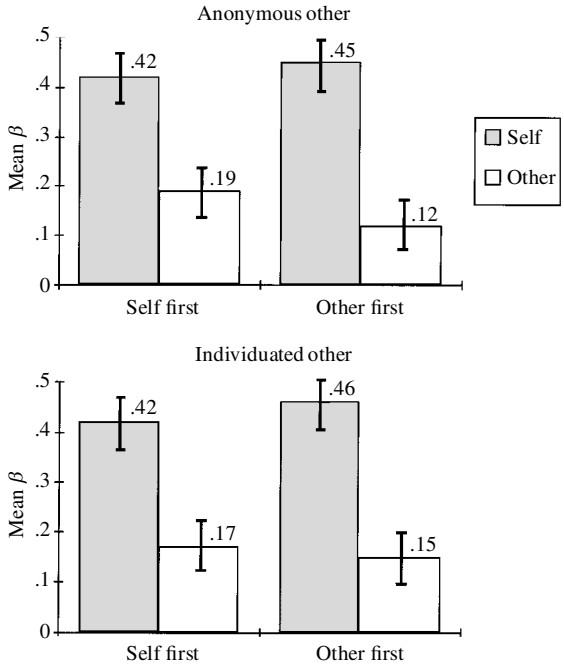

Figure 3. Weights assigned to information about self and other (Expt 2).

zero, indicating that both sets of endorsements predicted consensus estimates. A 2 (order) × 2 (individuation) × 2 (endorsements: self vs. other) ANOVA with repeated measures on the last factor supported the self–other hypothesis. Own endorsements predicted consensus estimates far better ($M = .44$, SD = .30) than the other's endorsements ($M = .16$, SD = .27; $F(1,141) = 75.48$, d = .98). This advantage of self-referent information could not be explained by the primacy this information usually enjoys. The primacy hypothesis was not supported because the pattern of projection was equally egocentric in both order conditions ($F(1,141) = 1.85$, d = .18). The individuation hypothesis was not supported either because the results were the same regardless of whether the other person was anonymous or individuated ($F < 1$). Taken together, the findings are more consistent with the egocentrism model than either the induction model or the false-consensus model.[7]

The induction model suggests that people use any endorsement information—be it their own or that of some other group member—in consensus estimation. The experimental design rested on the assumption that actual consensus in the newly established group was unknown, and that therefore participants could rely on both

[7] The manipulation of individuation (vs. anonymity) was intended to enhance the perceived usefulness of other-referent information in consensus estimation. Care was taken to portray the other student as a real-life cohort who was similar to the participant in important ways (e.g. by sex and classification status by the EFT). Hence, the other person ought to be perceived as being no more or less typical of the group than the participants themselves (see Rothbart & Lewis, 1988, for similar procedures). It is conceivable, however, that increased individuation is achieved in part by the inclusion of idosyncratic (i.e. atypical) elements. If so, participants should have relied *less* on the individuated than on the anonymous other. This did not occur, however.

their own and the other's endorsements. Both were individual members of this group, and neither of them enjoyed the advantage of being objectively more typical. Possibly, however, participants considered the new group as a fairly representative subgroup of the population of adults. This assumption would be reasonable because very little specific information about the group was conveyed. It was therefore necessary to ask whether the endorsements of the participants were, on average, more valid predictors of the actual MMPI consensus rates. On average, participants' own endorsements did not validly predict actual consensus either (mean $r = .03$, $SD = .32$). In other words, participants were not more typical than the presented other. As noted earlier, the endorsement profiles of the other were not correlated with actual consensus in the population at large. Therefore, the induction hypothesis could not explain the difference in the projection weights. This conclusion was further supported by the finding that, across participants, projection did not increase with the validity of their endorsements. Indeed, the correlation was moderately negative ($r(140) = -.20$, $p < .05$). Similarly, validity was not correlated with the weight given to the other's endorsements ($r(140) = -.03$) or with the difference between own and other's weight ($r(140) = -.13$, $p > .05$).

GENERAL DISCUSSION

All major models of projection (induction, egocentrism, false consensus) claim that self-referent knowledge shapes one's consensus estimates, rather than vice versa (Krueger, 1998a, 2000). Expt 1 yielded evidence for the accessibility and association hypotheses. This evidence supported the projection models and contradicted the introjection models. The projection models differ, however, in their assumptions about how and why people project in the first place. Expt 2 yielded evidence for the self–other hypothesis, and no evidence for the primacy or the individuation hypothesis. This pattern of results supported the egocentrism model and contradicted the induction model and the false-consensus model.

The egocentrism model of projection is part of a broader perspective in research on social perception that emphasizes the pivotal role of self-referent knowledge (e.g. Dunning, 2000). Many types of social judgment depend on judgments of the self. This is not to say that the self as a mental structure is qualitatively different from other structures, but simply that self-referent knowledge tends to be more emotionally laden, more complex, and more frequently and consistently activated than other-referent knowledge (see Wegner & Bargh, 1998, for a review). Two examples from the dichotic listening paradigm may illustrate this point. The so-called cocktail-party phenomenon is a case where self-referent information automatically diverts attention away from any other current task. Many (about 30% of) participants spontaneously shift their attention to the unattended channel after hearing their own name, but not after hearing somebody else's name. They then commit more shadowing errors in the attended channel and their performance slows down (Wood & Cowan, 1995). Similarly, performance in a probe-reaction task deteriorates when self-referent trait information is presented in the unattended channel. When, however, the self-referent information is presented in the attended

channel, performance improves. This facilitation effect illustrates that once it is attended to, self-referent information requires little processing (Bargh, 1982).

Projection vs. introjection revisited

The primacy of self-referent information in social perception does not imply that people never derive self-referent knowledge from their perceptions of social consensus. The notion of introjection is central to theories of self-categorization (Oakes, Haslam, & Turner, 1994), social comparisons (Suls & Wheeler, 2000) and conformity (Cialdini, 1993). Essentially, these theories suggest that when self-referent beliefs are weak, ambiguous or uncertain they are responsive to information (real or imagined) about others (e.g. Maheswaran & Chaiken, 1991). Despite its considerable theoretical interest, however, such assimilation of the self to the group has been difficult to demonstrate. One limitation of this effect is that it is sensitive to context. For example, minority members show it but majority members do not (Brewer & Weber, 1994). Another limitation is that it requires personal relevance. People who have not internalized sex norms, for example, do not assimilate their self views to these norms (Wood, Christensen, Hebl, & Rothgerber, 1997). Finally, the size of this assimilation effect tends to be small and its interpretation as public conformity or private belief change remains uncertain (Krueger & Clement, 1994).

Even when social consensus alters a person's own response to a stimulus, it is possible that, over time, this response becomes more accessible than the consensus information on which it was originally based. In other words, one's own response may ultimately be made with greater speed than consensus estimates, although the latter had originally shaped the former. Still, this possibility does not invalidate the general case in which consensus estimates are constructed from own endorsements. If the original consensus information has become relatively inaccessible for lack of practice, forgetting has occurred, and people have to reconstruct it when faced with the consensus task. They do this through projection, by using their own endorsements.

Instructors of social psychology know that the egocentric bedrock of social perception makes their job both difficult and exciting. Students tend to be surprised and intrigued by demonstrations of social influence. Believing, for example, that they themselves would not bow to conformity pressures, they also believe—projectively—that most others will not. When shown that most others do conform, they may still question the external validity of the study ('This will not replicate in Peoria'). By egocentrically neglecting that the behaviour of others is informative of their own behaviour in the same situation, students often fail to understand a crucial lesson of social psychology.

Egocentricity revisited

The three models of projection differ in how they explain the formation of the association between endorsements and estimates. The *induction model* assumes that people revise prior consensus estimates in light of observed behaviour. People are thought to have intuitive consensus estimates even before they consider their own responses or the responses of individual other people. They then compute posterior

estimates of social consensus given the responses they have observed. The present findings suggest, however, that self-referent information comes to mind even before consensus estimates are made (Expt 1). It is therefore dubious whether people ever entertain prior consensus estimates. The findings are more consistent with the *egocentrism model*, which assumes that consensus estimates are novel constructions based on endorsements. They are not revisions of prior estimates in light of these endorsements (Krueger, in press). The induction model also assumes that people give roughly the same inferential weight to their own endorsements and to the endorsements of other individuals when estimating group consensus. Their pronounced neglect of other information is at odds with this idea (Expt 2). Importantly, this neglect could not be explained by the fact that other information usually appears after own endorsements have been accessed. The primacy of self-referent information regardless of temporal order is consistent with the egocentrism model.

The traditional *false-consensus model* emphasizes the role of mediating cognitive mechanisms, such as the availability of relevant social information. One such mediator was examined by varying the degree to which another person was individuated. Although pretest data indicated that the manipulation of individuation (vs. anonymity) was strong, it affected neither the use of self-referent information nor the use of other-referent information. Still, participants did not entirely ignore the responses of the other regardless of the degree of individuation. Further increases in the degree of individuation might lead to greater sensitivity to other-referent information (Zuckerman, Mann, & Bernieri, 1982). It is doubtful, however, whether another person can ever be as individuated as the self under experimental conditions given the uniqueness of participants' own subjective perspective. Even if this were possible, qualitative experiential differences would probably remain. Trying to maximize similarities between the self and the other person, Krueger and Stanke (2000) recruited pairs of room-mates for a consensus estimation task. Although the responses that participants attributed to their room-mates predicted consensus estimates as well as their own responses, self-referent information remained more accessible (expressed faster, with greater confidence and less difficulty) and more reliable over time.

Taken together, the present findings are most consistent with the *egocentrism model*, which suggests that projection mainly springs from basic perceptual sources. The associations between self-referent and other-referent judgments appear to require little cognitive mediation. The egocentrism model can also explain why variations in temporal primacy or individuation have little effect on projection. The perceiver's own responses are fundamentally experiential, whereas the responses of others are indirect, 'as if' responses. The perception of a stimulus (be it a trait word, a statement, or an object) involves immediate and rich appraisals, whereas the perceptions of others are learned through acts of communication. Of course, communication may vary in its immediacy. What would happen, for example, if observers witnessed another person's facial expressions in response to pleasant or unpleasant stimuli? In this case, they might consider such information highly informative for social consensus. Conceivably, however, perceptions of consensus are mediated by facial mimicry of the other person's expression (Hatfield, Cacioppo,

& Rapson, 1994). If mimicry creates the correspondent affect in the observers (Zajonc, Pietromonaco, & Bargh, 1982), their perceptions of consensus are again egocentric.

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Appendix A: Anderson's (1968) adjectives and likableness ratings used in Expt 1

Adjective	L	Adjective	L	Adjective	L
sincere	573	inquisitive	413	nervous	196
understanding	549	self-assured	411	superstitious	189
trustworthy	539	calm	406	moody	182
thoughtful	529	careful	390	noisy	173
warm	522	serious	379	domineering	167
happy	514	persuasive	374	pessimistic	164
humorous	505	thrifty	372	inattentive	164
responsible	505	systematic	366	wasteful	160
broad-minded	503	talkative	352	envious	157
courteous	494	bold	336	sloppy	153
helpful	492	excitable	317	unsympathetic	153
enthusiastic	489	quiet	311	gloomy	136
ambitious	484	aggressive	304	lazy	126
witty	480	unpredictable	290	gossipy	119
cooperative	476	emotional	283	cold	113
neat	466	restless	274	irresponsible	106
punctual	466	daydreamer	260	nosy	102
prompt	465	rebellious	258	boring	97
creative	462	dependent	254	self-centred	96
amusing	460	silent	228	hostile	91
independent	455	forgetful	224	rude	76
irritable	449	timid	222	insincere	66
competent	447	fearful	214	obnoxious	48
sociable	429	sarcastic	210	liar	26
tidy	427	indifferent	202		
practical	425	clumsy	199		

Appendix B: MMPI-2 statements used in Expt 2

Item	Base rate	Profile 1	Profile 2
1. I certainly feel useless at times.	36	Disagree	Agree
2. It does not bother me that I am not better looking.	60	Disagree	Agree
3. In school I found it very hard to talk in front of the class.	53	Agree	Disagree
4. I enjoy a race or a game more when I bet on it.	30	Disagree	Agree
5. I am a very sociable person.	70	Agree	Disagree
6. I like dramatics.	63	Agree	Disagree
7. My eyesight is as good as it has been for years.	57	Agree	Disagree
8. I seldom worry about my health.	64	Agree	Disagree
9. At times I have very much wanted to leave home.	37	Disagree	Agree
10. I think I would like the kind of work that a forest ranger does.	51	Agree	Disagree
11. I think most people would lie to get ahead.	48	Disagree	Agree
12. I enjoy detective or mystery stories.	67	Disagree	Agree
13. I have a very few headaches.	80	Disagree	Agree
14. I have never done anything dangerous for the thrill of it.	39	Agree	Disagree
15. I often think, 'I wish I were a child again.'	22	Agree	Disagree
16. I do not worry about catching diseases.	64	Disagree	Agree