Social Psychology Quarterly
2003, Vol. 66, No. 3, 222–237

Egocentric Bias or Information Management? Selective Disclosure and the Social Roots of Norm Misperception*

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This paper reports on biases in group members' inferences about collective support for group norms. Whereas theories of "looking glass perception" suggest a tendency to project our own preferences onto others, this paper shows that observed biases simply may reflect flows of information through social networks. Members conceal counternormative behavior and disclose it selectively within confidence relations. This process yields structured inference, *in which members' inferences depend on their social ties, and also* pluralistic ignorance, *in which members generally overestimate collective support for existing norms. These predictions are evaluated in a field study of perceived normative consensus in five vegetarian housing cooperatives. Results fail to support the "intrinsic bias" argument, but demonstrate these forms of "information bias."*

> I conclude, therefore, that the imaginations which people have of one another are the *solid facts* of society, and that to observe and interpret these must be a chief aim of sociology.
> (Charles H. Cooley 1922:121)
> (author's emphasis)

Social behavior does not represent a simple aggregation of personal preferences or dispositions; our choices are often interdependent. When we choose among lines of action, our decisions often are predicated on inferences about others' preferences and intentions. Thus it is highly consequential that numerous researchers have documented systematic biases in these social inferences. In this paper I elaborate and investigate some classic "egocentric biases," suggesting that these apparent inferential errors may reflect flows of information rather than flaws in our mental machinery. I also discuss some implications of these "information biases" for the dynamics and stability of group norms.

In more than two decades of research, scholars have explored a "false consensus effect" (Ross, Greene, and House 1977) or "looking glass perception" (Fields and Schuman 1976), in which individuals' attitudes, traits, or behaviors are positively correlated with their beliefs about the prevalence of those attitudes, traits, or behaviors in a target population. The conventional investigation appears as a comparison of two social types, showing that people of one type believe that their own type is more common than people of the other type believe. In a group of Democrats and Republicans, for example, the Democrats will believe that there are more Democrats in the group than will Republicans, and vice versa. Although theorists propose various psychological mechanisms, most agree that this observed correlation represents an egocentric bias in perception or memory.

Scholars have considered the implications of such social projection for core theoretical problems of trust and the emergence of social exchange. For example, in the classic one-shot Prisoner's Dilemma game, where individuals usually are assumed to have no initial information about the other player's strategy, honest and dishonest players may project their own proclivities onto others (Dawes, McTavish, and Shaklee 1977; Goethals 1987; Messe and Sivacek 1979). Where actors may choose to exit the game

* I acknowledge the support of National Science Foundation grant SBR 98-01691. For guidance during my fieldwork, I thank Dorceta Taylor and Patrick West. For helpful comments on earlier drafts, I thank Christine Horne, Linda Molm, Dennis Regan, Michael Macy, and Ed Lawler, as well as three anonymous reviewers. Direct all correspondence to James A. Kitts, Department of Sociology, University of Washington, 202 Savery Hall, Box 353340, Seattle, WA 98195-3340; kitts@u.washington.edu.

(Macy and Skvoretz 1998; Orbell and Dawes 1991), this projection suggests that would-be cheaters will avoid playing and would-be cooperators will disproportionately engage in and benefit from social exchange.

Others have proposed an opposite bias called "false uniqueness" (Frable 1993; Goethals 1987; Mullen, Dovidio, et al. 1992): a negative correlation of individuals' own attitudes, traits, or behaviors with their beliefs about the prevalence of those attitudes, traits, or behaviors. Again, scholars generally survey two types of individuals (e.g. smokers and nonsmokers) and compare their estimates of the commonness of the two types; false uniqueness implies that individuals of each type believe that their own type is less common than individuals of the other type believe. Such an inverse projection could also have strong implications for social life. In particular, false uniqueness could stymie coordination or collective action wherever our decisions to participate depend on our estimates of how many others will join (Granovetter 1978; Macy 1991; Schelling 1978).

A third and related type of misperception is the classic problem of "pluralistic ignorance" (Allport 1924; Miller and McFarland 1987; O'Gorman 1986), whereby members of a population overestimate the public support for a prevailing norm.[1] False consensus and false uniqueness represent *relative* egocentric biases (e.g., as we compare two subgroups' estimates of their prevalence); pluralistic ignorance represents an *absolute* error for the entire group. For example, Schanck's (1932) classic study detailed a church community where individuals publicly enforced norms against drinking, smoking, and playing cards, although many resented or violated those norms in private. Pluralistic ignorance does not imply a correlation between members' own views and their estimates of public opinion; instead it is an overall inflation in members' estimates.

Scholars have investigated pluralistic ignorance for a broad variety of social norms and institutions, from the persistence of racial segregation in the American South (O'Gorman 1975; O'Gorman and Garry 1976) and caste-based hiring practices in India (Kuran 1995) to collective deviance among juvenile delinquents (Breznitz 1975) and drinking norms among Princeton undergraduates (Prentice and Miller 1993). Of course, overestimating public support for prevailing norms may allow vestigial or even harmful norms to persist, because dissent becomes difficult to organize (Breed and Ktsanes 1961).[2]

Pluralistic ignorance has attracted more sociological attention than false consensus, probably because accounts are grounded in strategic behavior rather than in mental flaws. In the conventional account, each member of a group observes other members publicly complying with a rule and believes that widespread compliance indicates support for the rule (even if her or his own public compliance is insincere). Members feel compelled to hide contrary preferences, thus reinforcing others' impressions of universal support for the norm. Researchers in public opinion (Glynn and McLeod 1984; Noelle-Neumann 1984; Taylor 1982) refer to this feedback as the "spiral of silence." Kuran (1995:113) notes that people may even feign support for the status quo, an elaboration he calls the "spiral of prudence."

Most research has focused on documenting these biases and investigating their cognitive or emotional causes. I begin this paper by briefly reviewing some of these psychological accounts. Then I explore some ways in which two pervasive patterns—false consensus and pluralistic ignorance—may emerge from the *same* regularities in social interaction, rather

[1] Pluralistic ignorance has received eight decades of attention in several disciplines, but there is little agreement on a precise definition for the term. Some definitions are very broad, as in "erroneous cognitive beliefs shared by two or more individuals about the ideas, feelings, and actions of others" (O'Gorman 1986:333). Much public opinion research (e.g. Korte 1972; O'Gorman 1975; Taylor 1982) focuses on errors in inferring the majority and minority position on an issue, and thus defines both pluralistic ignorance and the looking glass effect with reference to the 50 percent mark. Here I use the term more generally to indicate the mean error in members' impressions of collective support for group norms.

[2] See Bicchieri and Fukui (1999) for a formal investigation of pluralistic ignorance and the persistence of suboptimal group norms using computer simulation.

than from intrinsic flaws in perception or memory.

I posit here that beliefs about the prevalence of behaviors in a population are determined principally by flows of information between actors, including the distribution of social ties among members and individuals' choices to disclose or withhold information. I address the argument in an intensive study of five residential groups, analyzing members' estimates of overall compliance with group norms. Using observation, interviews, and survey measurement in five vegetarian cooperative houses, I examine members' tendencies to overestimate or underestimate the percentage of group members who actually exclude meat from their diets. In this way, I evaluate the proposed process of "information bias" as well as the conventional intrinsic bias explanations.

"INTRINSIC BIAS" ACCOUNTS OF MISPERCEPTION

Motivational Explanations: Self-Esteem and Self-Justification

According to social comparison theory (Festinger 1954), individuals are motivated to evaluate their beliefs and behaviors by comparing them with those of peers. We also tend, however, to overestimate agreement with peers in order to validate our existing beliefs and to justify our behaviors (Goethals 1987; Goethals and Darley 1977; Messe and Sivacek 1979). The desire to feel validated (Judd and Johnson 1981; Sherman et al. 1983) thus leads us to overestimate the number and diversity of others who share our opinions and behaviors (Goethals, Allison, and Frost 1979; Manstead 1982). This motivational explanation also accounts for the false uniqueness effect (Goethals 1987), when the trait or behavior has consequences for self-esteem. Individuals may view their negative traits as relatively common (false consensus as self-protective device), but also may regard their positive traits as relatively rare in the population (false uniqueness as self-enhancement device).

Cognitive Explanations: Attribution, Ambiguity, and Availability

Scholars have proposed several cognitive accounts of intrinsic bias, which do not refer to social actors' feelings or desires (Mullen 1983; Mullen and Hu 1988). First, the false consensus effect simply may be an extension of actors' tendency to attribute their behavior to situational causes, as specified in the actor-observer effect. Edward Jones (1990:132) posits that we see our own actions as "eminently reasonable responses to situational stimuli." Thus we expect other people, given the same opportunities and constraints, to act similarly (Gilovich, Jennings, and Jennings 1983; Zuckerman, Mann, and Bernieri 1982).

Another cognitive account addresses the measures used to demonstrate false consensus. Survey items may contain ambiguities that each respondent must resolve implicitly in interpretation. These "differences in construal" (Bosveld et al. 1995; Gilovich 1990, 1991:117) may leave respondents facing quite different questions. If respondents differ in their interpretation of the target behavior or referent, but assume that others interpret it in the same way as themselves, we can expect false consensus to emerge as we compare their estimates.

A third cognitive explanation locates the source of bias in individuals' limits of information processing. When respondents are asked to estimate characteristics of a large population, they may perform only a cursory reflection, recall one or more salient examples, and make inferences about the population from this sample (Zuckerman et al. 1982). This shortcut constitutes an "availability heuristic" (Tversky and Kahneman 1973), which saves the trouble of tallying all cases to derive a precise estimate. A particularly salient example would be a person's own behavior; an individual may economize on processing by using herself or himself as a substitute for systematic measurement of the population.

"INFORMATION BIAS" ACCOUNTS OF MISPERCEPTION

Both cognitive and motivational theories posit that misperception of other members'

behavior is due to intrinsic biases. In contrast to most researchers on false consensus, Kulik and Taylor (1980) conclude that actors do not always use "self-based" inference processes but also take advantage of "sample-based" information when it is available. Others (Dawes 1989; Hoch 1987; Krueger and Clement 1994) allow that self-based data in fact provide valid information and that individuals who ignore this information risk the opposite egocentric error, which Dawes calls a "failure of consensus."

This paper follows from such work: I argue that false consensus may obtain without an intrinsic mental flaw. I discuss three ways in which an apparent "misperception" may reflect the distribution of consensus information in naturally occurring groups. First, a false consensus effect may emerge spuriously, even among actors who perceive and recall with perfect accuracy, because of conflation of multiple target populations. Second, actors' estimates may reflect a homophilous sampling bias: their social ties expose them to others who are similar to themselves. Third, estimates may reflect a *communication* bias: actors may disclose counternormative views or behaviors mostly to their trusted friends, who are likely to share those views or behaviors. A combination of prudence and homophily thus generates false consensus. I refer to all three of these contextual effects as "information bias" (Shamir and Shamir 1997).

When False Consensus Is False: Conflating Target Populations

Some findings of egocentric bias simply may reflect flawed methodology, where false consensus is an artifact of true differences between target population means. For illustration, assume a voter census of two towns, A and B, each with 1,000 voters. If Town A is 75 percent Republican and 25 percent Democrat, while Town B is 25 percent Republican and 75 percent Democrat, then pooling across all respondents yields a study population of 2,000 voters, including 1,000 of each party. If all respondents have perfect and unbiased perception, most Republicans in the pooled sample would correctly report their own town to be largely Republican, while most Democrats would correctly report their town to be largely Democrat. A typical false consensus comparison suggests incorrectly that respondents overestimate the consensus for their political beliefs: both Republicans and Democrats would perceive that 62.5 percent of voters in their town belong to their own political party.[3] This misleading paradox—a *false* false consensus—plagues any study that pools distinct target populations without controlling for differences in the true means for those populations. This also is the case when investigators allow respondents to choose idiosyncratic target populations such as "peers" (Ross et al. 1977; Zuckerman et al. 1982), "close friends" (Judd and Johnson 1981), or "closest neighbors" (Fields and Schuman 1976). Other common measures, such as "students in the class" (Brown 1982), "boys in your school" (Sherman et al. 1983) and "students at this university" (Gilovich et al. 1983; Goethals et al. 1979; Manstead 1982), will produce a false bias if investigators pool different classes or schools.[4]

Selective Exposure: Homophily and Sampling Bias

Another structural explanation for the false consensus effect begins with homophily, the disproportionate similarity of actors tied by social relations. Indeed, individuals' tendency to interact with similar others through friendship ties (Cohen 1977; Festinger 1954; Kandel 1978) or shared memberships in voluntary associations (Feld 1982; McPherson and Smith-Lovin 1987) is one of the most broadly documented regularities in social psychology. If groups contain relatively uniform populations, then members perceive a biased sample of the social world. This structure of affiliation constitutes an information

[3] Consider that 750 Republicans in Town A will accurately report their town to be 75 percent Republican, and 250 Republicans in Town B will accurately report 25 percent, producing a pooled mean of $\frac{750 \times 75\% + 250 \times 25\%}{1000} = 62.5\%$ for the Republicans. The same will be true for Democrats.

[4] Pooling groups clearly is not a problem if respondents are estimating a broader common target (e.g., "college students in general"). The problem arises when we pool *targets*.

bias and leads to an illusion of bias in perception.

In a comprehensive literature review, Marks and Miller (1987) conclude that this "selective exposure" is the main cause of false consensus. According to this explanation, actors generalize from their homophilous peer group to the whole target population, as a result of the cognitive availability (Tversky and Kahneman 1973) of their personal sample. Mullen, Atkins, et al. (1985) meta-analyze 115 hypothesis tests of false consensus and also attribute much of the effect to selective exposure. Although the literature generally has identified the core mechanism of selective exposure as a cognitive bias, empirical work has not directly examined this cognitive component.[5] In fact, with a few exceptions (Bosveld, Koomen, and Van-der-Pligt 1994; Deutsch 1988; Sherman et al. 1983), scholars have not operationalized the selective exposure mechanism at all.

Selective Disclosure: Structures of Confidence and Secrecy

I also propose an extension of selective exposure that will be particularly relevant to issues of deviance and social norms. Erving Goffman (1963:95) discusses the interpersonal strategies of "information management," by which individuals divulge or conceal information about activities that may "discredit" them. Inspired by this idea of information management, I seek to explain errors in members' estimation of their peers' support for group norms. I assume a simple bias in communication: individuals tend to withhold information about their counternormative behaviors and thus "pass" as compliant (Goffman 1963:73) because of a fear of sanctions or censure. Although these outcomes may not always be severe enough to discourage rule-breaking behavior, they may easily lead deviants to conceal such behavior from authorities or whistleblowers. From an individual-level bias against disclosing deviance, I first predict pluralistic ignorance, or a general overestimation by group members of support for the norm. The tendency to hide deviance exaggerates the appearance of support for the status quo.

In attributing the bias against disclosure to anticipation of censure or sanctions, I predict not only an overall reluctance to reveal deviance, but also a selective disclosure of deviance within confidence relations: individuals are more likely to share discrediting information with trusted friends than with strangers or casual acquaintances. This suggests that friends of deviants will have more access to information about deviance in the group. Of course our friends tend to be similar to ourselves; thus, selective disclosure combines with homophily to produce an information bias toward false consensus.

EVALUATING COMPETING ACCOUNTS FOR FALSE CONSENSUS

I have discussed two intrinsic bias explanations (motivational and cognitive) and three information bias explanations (target group conflation, selective exposure, and selective disclosure) for observed false consensus effects. In this study I aim primarily to test the information bias perspectives against the intrinsic bias perspectives, showing that we can account for the observed false consensus effect as a product of access to information, without appealing to intrinsic psychological processes. In comparing these two broad approaches, we must ask whether the false consensus effect disappears when we control for differences in information access. If an observed false consensus effect is explained adequately by access to information, then a theory of intrinsic bias is superfluous.

I also aim to elaborate these types of information bias. I can eliminate the problem of conflating target populations (the "false false consensus") by measuring and correcting for target population means. Differentiating the other two sources of information bias—selective exposure and selective disclosure—is more challenging because they predict similar structural effects. Ideally I would address selective dis-

[5] As this false consensus may obtain through unbiased inference processes drawing from available information, I describe selective exposure as a structural information bias rather than as a cognitive distortion.

closure by exhaustively measuring the actual communications between members, but this is not possible here. Instead, as a first step toward distinguishing the selective disclosure effect, I examine groups in which all members have regular contact and thus are exposed to their entire target population. All members of these groups spend three or more hours per day together, for months or years. Yet they may reveal discrediting information only to certain other members, thus allowing an invisible structure of confidence relations to emerge in a network that is otherwise fully connected. I then interpret an effect of ties to deviants here as due largely to selective disclosure rather than to simple exposure.

As a second step toward demonstrating the effects of selective disclosure, I compare large groups, where conversation is segmented into cliques, with small groups, where conversation is generally public and universal. The large groups thus facilitate private talk and promote selective disclosure, while any disclosure in small groups is relatively public. I predict an effect of friends' behavior on members' estimates only where actors can exchange information privately. In contrast to the proposed account, other explanations would predict a similar false consensus effect for both large and small groups.

Finally, while other perspectives predict only a *relative* bias toward consensus, the proposed process of selective disclosure suggests a net overestimation of compliance for the entire group. I thus predict an *absolute* bias, namely pluralistic ignorance.

RESEARCH CONTEXT

I investigate the argument using a quasi-experimental study of existing social groups. I examine five student cooperative houses, two "large" (110 and 109 members) and three "small" (26, 24, and 24 members), chosen from three different colleges and universities. Each of these houses serves only meatless food and promotes vegetarianism among members. I observe, however, that members have varying dietary preferences. Each of these houses is part of a system of (primarily nonvegetarian) cooperative houses, and house membership within each system is assigned by lottery. Many respondents thus did not choose to live or eat in a vegetarian house. In fact, a majority of members in each of these five houses eat some kind of meat while away from the house. By analyzing the abstention rates estimated by the "abstainers" and the "eaters" in these five houses for three types of meat (beef, chicken, and fish), we can investigate the intrinsic bias and information bias explanations.

Observation and interviews revealed the presence of an antimeat norm in each house, though the number of actual abstainers varied by house and by food type. Although consumption of meat outside the house was not prohibited in house bylaws, members described the vegetarian theme as a pervasive ideal. One member remarked illustratively, "I feel like we've all made this pact together, and if one person breaks the deal, that's...you know...it's breaking the whole pact."

Interviews supported the core mechanism of selective disclosure: meat-eating members explained that they often withheld information about their diets in interaction with other members. Many who indicated that they ate meat products outside the house also said that they would refrain from doing so if vegetarian house members were present. They often attributed this secretiveness to concern for the audience's comfort: "I wouldn't want to gross them out" or "I wouldn't want to offend them." Others said that vegetarians would lecture them or make them feel guilty.

Field observation also supported the assumption that the large houses facilitated private conversation between friends. The meeting/dining rooms in the two large houses included more than 10 round tables where groups of friends could sit together for semi-private conversation. In contrast, members in each of the three small houses ate at a single large table with no boundaries or gaps to segregate conversations. Thus a disclosure between friends in a small house would be essentially public and all members would have roughly equal access to this information. Admittedly members of these houses could have written secret notes to each other, met at outside locations to confess their violations, or taken other such extreme mea-

sures.[6] Indeed, I do not assume that deviants (meat eaters) would never share information in the small houses, but only that divulging such information selectively would be more difficult and thus more limited in the small houses than in the large houses.[7]

HYPOTHESES

I investigate seven hypotheses using these data. I first predict a simple false consensus effect in the pooled sample:

Hypothesis 1: A conventional comparison will demonstrate a false consensus effect: compliant members will believe that more members comply than will deviant members. Thus there will be a positive correlation between members' own compliance choices and their estimates of overall compliance in the group.

I then examine the structure of information available to each member, asking whether this can explain the distribution of compliance estimates. First, I must allow for the fact that respondents actually belong to five different groups, with different *true* levels of compliance. To eliminate this uninteresting conflation of target populations, or "false false consensus," I subtract the true house abstention rates from each respondent's estimate. This yields an error score for each respondent, which serves as the dependent variable. I investigate the following model of error:

$$Error = \alpha + A\beta + X\gamma + \varepsilon, \qquad (1)$$

where A is a set of variables representing a respondent's access to information and X is the respondent's own compliance choice. As error is decomposed in this way, the parameter a represents absolute bias common to all members of the group (pluralistic ignorance), β is a vector of parameters representing structured inference effects, γ represents a net egocentric bias (false consensus or false uniqueness), and ε includes residual error for individuals, not captured by the biases specified above. This model frames the following hypotheses.

First, if members tend to conceal stigmatized behaviors, then we should find an overall bias in information received about deviance. I thus predict pluralistic ignorance ($\alpha > 0$):

Hypothesis 2: Members will tend to overestimate the level of compliance.

If this hypothesis is rejected, there is little evidence for the model, which is predicated on a pervasive reluctance to disclose deviance.

Next I investigate variation among members in their access to information about others' behavior, with the expectation that such information attenuates this upward bias ($\beta < 0$). I use three specific variables to represent access to information:

Hypothesis 3: Long-standing members will give more accurate (lower) estimates of compliance than will members who joined recently.

Hypothesis 4: Live-in members will give more accurate (lower) estimates of compliance than will board-only members.

A further specification of information access allows for selective disclosure of deviance within confidence relations:

Hypothesis 5: Close friendship ties to known deviants will increase knowledge of deviance and will improve (reduce) estimates of compliance.

We can compare information bias with intrinsic bias by controlling statistically for the access to information described above. If false consensus is due to faulty cognitive machinery, then modeling access to information should not attenuate the relationship of one's own compliance to error in one's estimates of group compliance. The structural

[6] The fieldwork was conducted in early 1995, when e-mail was not a prevalent means of communication in these student populations. Although the Mosaic Corporation recently had begun marketing a graphical World Wide Web browser, none of these houses had a network connection, modem, online bulletin board, or e-mail distribution list. Widespread electronic communication would have threatened the comparison of large with small groups here, but it also presents opportunities for future research directly measuring communication.

[7] The focus here is this comparison of selective with undifferentiated conversation arenas, not group size itself. However, group size and structural differentiation are likely to be correlated empirically (Blau 1970), as they are here.

explanations, however, would predict that information access is a necessary link; thus a false consensus bias will not obtain in the fully specified model ($\gamma = 0$):

> *Hypothesis 6:* Members generally will not project their own choices onto others, so the simple false consensus effect proposed in Hypothesis 1 will disappear when access to information is controlled.

Beyond demonstrating that access to information explains the apparent egocentric bias, I emphasize selective disclosure through two aspects of research design. First, I focus on communication biases by observing only groups in which all members are exposed daily to their entire reference population (thus limiting variation in overall exposure). Second, I predict that this structural effect depends on private communication, which will be facilitated in the large houses and hindered in the small houses:

> *Hypothesis 7:* Friendship ties to deviants will reduce estimates of compliance in large houses, but will have little or no effect in small houses.

METHODS

The study began in 1989 with participant observation at the two large houses and two of the three small houses.[8] This close contact with the study population allowed for familiarity with house routines and policies. In late spring 1995, I administered a questionnaire at meals for each house, obtaining responses from 75 percent of large-house members and 68 percent of small-house members. Although several members thus missed the unannounced survey events and were unable to respond, there is little reason to suspect that they differed systematically from the substantial majority of members who were included. It is likely, however, that the 3 percent who refused to participate in the study were disproportionately nonvegetarian; I will consider the implications of this mild nonresponse bias.

Respondents indicated how often they ate each type of food (beef, chicken, and fish). Respondents who *completely* excluded a food type from their diets are coded 1 for that food type and are labeled "abstainers." All others are coded as 0 for that food type and are labeled "eaters."[9] Aggregating these self-reports provides an independent measure of the percentages of the groups that actually excluded these food types. Because of the nonresponse pattern mentioned above, it is likely that these aggregated statistics slightly overestimate the compliance (abstention) rate. This would understate any pluralistic ignorance and would mildly bias results against Hypothesis 2.

Respondents wrote the initials of their five closest friends whom they saw regularly at the time of the study. Then they indicated which of those five friends were also members of the same house at that time, and which of them completely excluded each type of meat from their diets. Because of the salience of diet in these groups, almost all subjects could easily provide this information about their five closest friends.[10]

After answering numerous other questions, respondents were asked to estimate the prevalence of abstinence for three types of meat ("What % of the co-op do you think completely excludes beef/chicken/fish?") Comparing the mean estimates for eaters and for abstainers allows a conventional investigation of false consensus or false uniqueness.

[8] This early fieldwork should not threaten the validity of questionnaire or interview responses because the investigator was unknown to virtually all respondents at the survey events, as a result of membership turnover between participant observation and measurement.

[9] I make a crucial distinction between completely excluding and all other levels of eating. Simply "cutting down" on meat is trivial in a house that serves only vegetarian meals. In contrast, complete abstention entails a substantial effort in reading product ingredients, refusing food offered by hosts, and avoiding certain restaurants. In all five houses, only a minority of members completely abstained from all three types of meat.

[10] Respondents' perceptions may not represent their friends' *true* diets if such information was withheld. (Indeed, there may be no phenomenological distinction between having a vegetarian peer and having a *poseur* vegetarian peer.) Given the frequency of conversations about diet, however, I assume that members were not guessing about friends' behaviors, but were reporting accurately the information they had received.

A corrective effect of ties to deviants could support selective disclosure. However, an individual with more deviant friends in the house could simply have more close friends in the house and thus could enjoy greater overall access to information about others' behavior. We may partial out this effect by controlling for the total number of close friends who are house members, seen as an actor's level of embeddedness in group relations. The questionnaire included two other items representing the overall exposure to sample-based information: respondents reported the date when they joined the house—yielding a measure of membership length (recorded in months)—and whether they were currently live-in (1) or dining-only (0) members.

Although most of the survey items show no missing data, a few members (17 of the 165 large-house respondents and two of the 50 small-house respondents) were unwilling to estimate a house abstention rate for beef, chicken, or fish. Such cases were omitted from the analysis for the corresponding meat type(s).[11] Sparse missing values in the count variables (number of friends in the house and number of friends excluding each meat type) were also recorded. I imputed these counts with random numbers from a Poisson distribution with the observed mean for each house. Though this introduction of noise could increase the likelihood of rejecting Hypothesis 5, the results were similar whether these incomplete cases were deleted, imputed with the group mean, or replaced with random values.

After simple comparisons of eaters with abstainers, linear regression models allow direct estimation of the parameters in Eq. (1). I run separate models for small and large houses to allow for the possibility (indeed, the expectation) that slopes may differ for the two house sizes.[12] To guard against spurious effects due to unmeasured heterogeneity across houses, I assign each house a unique intercept term, allowing for house-specific bias levels. Thus the models are fit without a constant term, but with an indicator variable for membership in each house. This procedure has no effect on coefficients or standard errors for other covariates. We can interpret the intercept for each house (α_i) as the net pluralistic ignorance in that house, controlling for the remaining model variables. To correct for mild heteroscedasticity, or differences across houses in the variance of residuals, each case is weighted by the reciprocal of the estimated variance of residuals for the house in question.[13]

The observational nature of the study does not permit experimental control; thus all causal inferences are tentative and demand further experimental investigation.

RESULTS

I begin the presentation of findings with a typical false consensus analysis on the pooled sample, comparing the eaters' and the abstainers' estimates of the percentage of members who excluded each food type. As shown in Table 1, abstainers indeed gave significantly higher estimates than did eaters.[14] Own dietary choice is positively correlated with estimates of house abstention for beef (r = .163), chicken (r = .147), and fish (r = .127). Thus we see support for Hypothesis 1.

Table 1. Estimated Percentage Abstaining, by Personal Diet

	% Estimated Abstaining		
	Abstainers	Eaters	Difference
Beef	78.86	71.84	7.02**
Chicken	67.82	61.57	6.25*
Fish	60.92	55.32	5.60†

† $p < .10$; * $p < .05$; ** $p < .01$ (Mann-Whitney test)

[11] Missing values on the dependent variable were not significantly related to any predictor.

[12] I do not run a separate regression for each house because there are not enough cases to estimate the models. Further, both theory and exploratory analyses support pooling houses with others of the same size.

[13] Although this weighted least squares (WLS) estimation improves model fit slightly, the conclusions of weighted and ordinary least squares (OLS) regression are identical.

[14] When data are pooled across all five houses, the assumption that populations (estimates by eaters and by abstainers) are normally distributed with equal variance is particularly strenuous. For this reason I report statistical significance using nonparametric Mann-Whitney tests for the equality of populations. Independent sample t-tests for the differences between population means yield identical conclusions with greater confidence.

The *actual* percentages of members who abstained from each type of meat were much lower than estimated by either the eaters or the abstainers: 62.19 percent for beef, 52.75 percent for chicken, and 42.42 percent for fish. Although this baseline population bias is irrelevant to the question of egocentric bias, it begins to substantiate the argument for pluralistic ignorance (Hypothesis 2). A multivariate analysis will be required to distinguish the sources of error more rigorously, but the estimated and true means for all houses are provided in Appendix Table A1.[15]

In decomposing the error in members' estimates, we must remember that *actual* differences in target population means can lead to spurious egocentric bias. In the pooled sample, members who abstain from meat are more likely than eaters to live in houses that contain a higher proportion of vegetarians. If respondents provide unbiased estimates, we then should expect respondents in the pooled sample to report their housemates as relatively similar to themselves. Thus I correct for differences among target population means by subtracting the measured compliance level for the house from each respondent's estimate. This step yields the dependent variable, error.

Modeling error as a function of a respondent's own behavior (personally abstain) and access to information (membership length, live-in member, deviant friends) allows us to address the remaining hypotheses. In showing that error is a function of information access (Hypotheses 3–5) and that these variables are sufficient to account for the false consensus effect (Hypothesis 6), we contrast information bias with the intrinsic bias theories. Further, by finding an overall pluralistic ignorance (Hypothesis 2) and showing that structured inference depends on private communication (Hypothesis 7), we support selective disclosure as a distinct mechanism of information bias.

To assess these hypotheses, Table 2 shows weighted least squares (WLS) parameter estimates for the model applied to the two large houses.

In support of Hypothesis 2, the coefficients for House A (α_A) and House B (α_B) show that respondents in the two large groups tend to overestimate compliance with vegetarian norms.[16] Results also generally

[15] Recall that the "true" compliance rate is computed using the aggregated self-reports from my survey. As noted, a mild response bias in favor of vegetarians suggests that this measure may slightly exaggerate compliance for all houses. This implies a conservative test of Hypothesis 2.

[16] Recall that the model allows a unique intercept for each house. Instead we could arbitrarily omit House A as a "reference category" in Table 2, rename α_A as the "constant" term, and replace the other coefficient with the difference $\alpha_B - \alpha_A$. For beef, this proce-

Table 2. Weighted Least Squares Coefficients From the Regression of Error on Independent Variables (Large Groups)

	Beef	Chicken	Fish
Personally Abstain	3.832	–.690	1.092
	(2.525)	(2.902)	(3.214)
Deviant Friends	–2.889*	–3.434*	–3.838*
	(1.438)	(1.552)	(1.558)
Membership Length	–.265*	–.268*	–.251†
	(.113)	(.134)	(.145)
Live-In Member?	–3.867	–3.817	–3.794
	(3.508)	(4.017)	(4.355)
Embeddedness	1.401	1.828†	3.262*
	(.904)	(1.098)	(1.297)
α_A	18.738**	17.170**	21.262**
	(3.685)	(4.158)	(4.313)
α_B	17.489**	18.368**	12.493**
	(3.448)	(3.395)	(4.156)
N	152	151	150

Note: Numbers in parentheses are standard errors.
† $p < .10$; * $p < .05$; ** $p < .01$ (two-tailed tests)

support structured inference. The two variables representing overall access to "sample-based" data are negatively related to bias. Although long-standing members (Hypothesis 3) and live-in members (Hypothesis 4) tend to give lower and thus more accurate estimates for all three types of meat, only the former effect is statistically significant. Further, friendship ties to deviant members appear to strongly reduce overestimation of compliance for all types of meat, in support of Hypothesis 5. The model predicts that a member with five deviant friends in the group will believe compliance is 14.4 points lower for beef, 17.2 points lower for chicken, and 19.2 points lower for fish than will a member with five compliant friends in the group. These differences are substantial as well as statistically significant.

In contrast to these marked structural effects, I find little relationship of personal abstention to error when the structure of information access among members is controlled and when the model corrects for known differences in target population means. This finding supports Hypothesis 6 and undermines the intrinsic bias argument. Embeddedness shows a positive effect, though this is weaker and not consistently significant. If we assume that having more close friends in the group entails spending more social time in the house, this result might seem to weakly contradict the proposed effect of information access. Recall, however, that this parameter represents the residual effect of in-group ties *net of* the effect of ties to eaters. Although it implies that ties to abstainers could inflate estimates of group compliance, it also may be an artifact of measurement.[17] It is plausible that members who are vegetarian are more likely to discuss their diets with others who they know are also vegetarian (a parallel communication bias for positively valued traits). Exploring this generalization would require independent measures of compliant and deviant friends.

If smaller houses provided little opportunity for private talk, we should expect less selective sharing of discrediting information. Thus I predict little structured inference in the small houses. My predictions for false consensus (Hypothesis 6) and pluralistic ignorance (Hypothesis 2) remain unchanged, however. Table 3 examines these relationships for the three small groups.

Although we should be cautious in interpreting statistical significance levels for the small groups because of the sample size, estimated effects of deviant friends are weak and inconsistent in the small houses, as well as statistically insignificant. This substantial discrepancy with the results in Table 2 supports the proposed mechanism of selective disclosure. Ties to deviant friends clearly cannot explain error adequately for any of the types of meat. Some absolute bias for small groups still is present, as shown by positive coefficients α_C, α_D, and α_E; this implies a pluralistic ignorance in the small houses for all three types of meat. The directional effects are consistent, but many of these coefficients also do not reach statistical significance.

Surprisingly, we see a *negative* egocentric bias (false uniqueness) at the individual level for small houses, but this effect is significant only for beef. Although I recognize that it may not be robust, I address this unexpected finding later.

In addition to examining the hypotheses, these data allow tentative explorations of moderating effects proposed by intrinsic bias theories. These accounts focus on "accuracy" in consensus estimates (i.e., comparisons of estimates with the true population value). For example, cognitive theorists (Mullen and Hu 1988; Sanders and Mullen 1983) hypothesize that the majority will underestimate consensus for their position and the minority will overestimate consensus for theirs.

dure would yield a constant term (18.738) and a House B parameter (–1.249) that would test the significance of the difference between Houses A and B, a question of no interest here. Because I am interested in the difference between the intercept for each house and zero, I use the equivalent multiple-intercept model.

[17] The measure used (five closest friends) creates a linear dependence of compliant friends on deviant friends and embeddedness; thus all three effects cannot be estimated together. The specification used allows us to estimate the effects of deviant friends while partialing out the effect of embeddedness. Including compliant friends in the model instead would conflate this effect of embeddedness with the effect of deviant friends and thus would hinder our interpretation of the most interesting parameter.

Table 3. Weighted Least Squares Coefficients From the Regression of Error on Independent Variables (Small Groups)

	Beef	Chicken	Fish
Personally Abstain	–11.816*	–6.458	–5.447
	(5.423)	(4.829)	(4.649)
Deviant Friends	–2.296	1.169	–.721
	(3.583)	(2.476)	(2.723)
Membership Length	.128	.202	.168
	(.285)	(.236)	(.260)
Live-In Member?	–8.950	–2.814	.920
	(7.033)	(6.654)	(7.198)
Embeddedness	2.426	.555	.328
	(1.471)	(1.615)	(2.195)
α_C	13.710	4.028	26.626**
	(9.832)	(8.934)	(8.650)
α_D	11.388	8.800	14.543†
	(9.249)	(7.933)	(7.929)
α_E	11.897	6.314	3.910
	(10.628)	(8.366)	(8.756)
N	48	48	48

Note: Numbers in parentheses are standard errors.
† $p < .10$; * $p < .05$; ** $p < .01$ (two-tailed tests)

Motivational theorists (Suls and Wan 1987) hypothesize that "people who behave in desirable ways" (Suls, Wan, and Sanders 1988:66) will overestimate consensus for their behavior, while "people who behave in undesirable ways" will underestimate such consensus.[18]

Although the tiny sample size makes comparisons across groups purely exploratory, it is intriguing that this study finds little evidence for either hypothesis.[19] Depending on the particular house and the particular kind of meat, either eaters or abstainers may have constituted a majority position, but this condition was not at all related to the direction of error. Also, abstaining from meat was valued positively for all houses, but this behavior was overestimated by both eaters and abstainers in all houses, directly opposite to the motivational prediction. In regard to accuracy, vegetarians overestimated social support for their behavior, and meat eaters underestimated social support for theirs. We know, however, that these discrepancies simply reflect the overall pluralistic ignorance.

DISCUSSION

Although we should interpret all results as tentative because of the small scope and other limitations of the study, we can consider some implications for the literature on false consensus. The failure to replicate a standard false consensus effect after controlling for information access provides modest evidence against the intrinsic bias theories of false consensus. This finding, however, does not contradict the body of empirical evidence for false consensus through selective exposure because my research design has intentionally minimized variation in exposure by examining residential groups with very high levels of in-group interaction. Indeed, my failure to find a robust false consensus effect where I have rigged the study against selective exposure anecdotally supports earlier conclusions that selective exposure plays an

[18] Despite the misleading reversal of wording, these studies argue that both types will err in the same direction: both the majority and the minority will overestimate the minority; similarly, performers of both desirable and undesirable actions will overestimate the undesirable actions. This interpretation unfortunately conflates baseline population error (α) with egocentric bias (γ). In fact, many of these "absolute false uniqueness" (Goethals 1987:152) findings appear with a *positive* correlation of own behavior and consensus estimates.

[19] There are only five different groups and three types of meat to be compared. Further, formal comparisons across types of meat would be complicated by the obvious lack of independence in observations within subjects.

important role in the false consensus phenomenon.

Little false consensus appears in these groups of limited size (whether 24–26 or 109–110), but interviews suggested a much stronger effect at the college population level, where we might expect selective exposure to operate. Although I made no survey measurement of consensus estimates for this broader population, I asked interviewees at one college to estimate the prevalence of vegetarianism at their school. The meat eaters estimated that 10 to 25 percent of the student population was vegetarian. Self-identified vegetarians from the same college, however, estimated that up to 50 percent of the students were vegetarian. These estimates appear to indicate a false consensus effect, but these data were not collected systematically; therefore this result is anecdotal.

Support for the pluralistic ignorance argument was consistent, although somewhat stronger in large groups. Baseline error in estimates seemed to be comparable across the three small houses for beef and chicken, but the coefficient for House C was much larger for fish. Why the explosion of pluralistic ignorance here? This group exerted the strongest pressure to abstain from meat. Some members—self-labeled "vegan fascists"—demanded that others avoid all egg and dairy products as well as meat. Private interviews, however, revealed that many members secretly visited local restaurants to eat fish. Though a majority of house members confessed this personal violation in the anonymous survey, several had not revealed it to other members.

Now we can consider the unexpected negative relationship between own compliance and estimates of group compliance in small houses. Although this negative egocentric bias is statistically significant only for beef in Table 3, it further contradicts the conventional false consensus explanations. Although an observed false uniqueness seems compatible with my one-sided hypothesis (of no false consensus), such a prediction cannot be derived from the process of selective disclosure.[20] Frable's (1993) argument that in-group deviants overestimate others' compliance because of an emotional bias toward feeling marginal does not fit here: meat eaters are hardly pariahs in these student populations. It is more plausible that in-group deviants may experience a "failure of consensus" (Dawes 1989), discounting themselves in estimating group proportions. Indeed, such a self-discounting effect would be endemic to small groups. Further experimental work is needed to explore this conjecture in greater detail.

Using nonexperimental data in analysis of perceptions and behavior usually invites ambiguity. In this study, however, reverse causation is often implausible or unparsimonious. The proposed effects follow from a few simple assumptions; reverse effects would require numerous domain-specific (and often elaborate or counterintuitive) assumptions. For example, shall we propose alternatively that an actor tends to choose others as friends who share traits that she or he tends to overestimate in the group (but only in larger groups)? While the proposed hypotheses also may be tested more rigorously in controlled experiments, here I investigate the traces of information bias in a natural setting. Social impressions may develop over months or years in real-life organizations; therefore my field study may provide a complementary perspective that would not be feasible in the laboratory.

In this paper I have addressed psychological theories of false consensus, which predict a positive correlation between actors' own beliefs or actions and their estimates of the social prevalence of those beliefs or actions. I argue that this error need not imply an intrinsic bias, but that it may emerge through the structured exchange of information. False consensus may obtain because members send and receive socially biased samples of information, even if they encode and recall this information accurately.

From an assumption of selective disclosure by deviant members, I predict a general overestimation of compliance, a corrective effect of access to sample-based information, and a structural bias determined by each

[20] Although false uniqueness findings are rare in published research, perhaps such an effect may emerge at the individual level after we partial out the structural determinants of egocentric bias. The present study cannot address this conjecture.

actor's network of confidence relations. I also predict that this structural effect will obtain only when communication is differentiable, such that discrediting information can flow according to individual discretion. Multivariate analyses generally support these predictions, suggesting that access to information through local networks may be essential in some classic patterns of social inference.

Appendix Table A1. Estimated Percentage Abstaining by Personal Diet Choice, by House

	Beef			Chicken			Fish		
	Mean Abstainer Estimate	Mean Eater Estimate	Actual Value	Mean Abstainer Estimate	Mean Eater Estimate	Actual Value	Mean Abstainer Estimate	Mean Eater Estimate	Actual Value
Large Houses									
House A (109 Members)	80.1	77.1	(62.2)	68.7	68.9	(54.9)	63.3	60.4	(41.5)
House B (110 Members)	83.9	78.0	(63.9)	69.0	67.6	(53.0)	61.9	57.3	(47.0)
Small Houses									
House C (26 Members)	82.1	94.7	(83.3)	76.5	82.5	(77.8)	68.1	73.9	(44.4)
House D (24 Members)	68.1	81.8	(69.2)	59.2	65.8	(53.9)	55.0	66.7	(46.2)
House E (24 Members)	31.5	38.9	(31.6)	18.0	26.3	(15.8)	16.3	22.3	(15.8)

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