

Egocentric Pattern Projection: How Implicit Personality Theories Recapitulate the Geography of the Self

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Five studies demonstrated *egocentric pattern projection*, in that the implicit personality theories (IPTs) that participants held about other people tended to recapitulate the terrain of their own personality. To the extent that participants believed they possessed 2 traits to a similar degree within themselves, they tended, through their judgments of others and estimates of population parameters, to claim that the 2 traits were positively correlated in other people; and if they believed they possessed 2 traits to a dissimilar degree within themselves, they tended to claim that the 2 traits were negatively correlated in other people. Further evidence showed that information about the self plays a causal role in the construction of implicit theories, making a unique contribution to the shape of IPTs over and above that of information about another person. The relevance of these data for recent controversies over egocentric social judgment is discussed.

Keywords: projection, egocentrism, social judgment, implicit personality theories

Whether in offering advice, making decisions, or forecasting behavior, people often face the task of forming impressions of others on the basis of sparse or incomplete information. Nathan is clearly an extrovert around the office, but is he likely to be a fan of the theater? Simone has a particularly witty sense of humor, but is she more of an idealist or a pragmatist? When people are just getting to know someone or are exposed to him or her in a single context (e.g., a job interview, a first date), they are often required to go beyond their direct experience to form a fuller impression about the person's personality.

In making such inferences, people often lean on implicit personality theories (IPTs)—beliefs about how personality traits are configured within another person (Bruner & Taiguri, 1954; Schneider, Hastorf, & Ellsworth, 1979). IPTs contain much information about which traits tend to be associated within people (e.g., *dominant* suggests someone who is aggressive, and *submissive* suggests someone who is also passive). Thus, IPTs allow people to go beyond the sparse data they know about someone to infer what else is likely to be true about his or her personality.

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Scholarship on IPTs, however, suggests that accurate IPTs are quite difficult to learn solely through day-to-day empirical observation. The implicit theories that people possess may not reflect reality to the extent that they make assumptions. There are many reasons why the implicit theories that people hold may wander away from accuracy. Different trait-relevant behaviors may not occur close together in time, and actual correlations between such behaviors may be quite low (Crocker, 1981), making learning about covariations between traits difficult. This problem is often coupled with people's difficulty in picking up actual covariations on display in the environment (Cordray & Shaw, 1978; D'Anrade, 1974; Ebbeson & Allen, 1979). Thus, it is not surprising that there is a long-standing question about what IPTs are actually based on. Previous researchers have conceived of IPTs as culturally shared beliefs (Schneider et al., 1979; Wishner, 1960) that are guided in large part by semantic similarity (D'Anrade, 1974).

In this article, we suggest that one important source of a person's IPTs is the self. More specifically, we propose that people use the way traits are configured in the self to form beliefs about how traits are aligned in other people—that in inferring the structure of another person's personality, people presume, at least in part, that the terrain of another person's character recapitulates the geography of their own. If two traits go together in the self, then they are assumed to go together in other people. If two traits clash in the self-concept, then they are presumed not to co-occur in other people.

Importantly, we stress the unique contribution of the self in this pattern of inferences. We propose that similarities found between self-concept and the IPTs do not arise because the self is simply one exemplar among many that people refer to in forming a theory of how traits co-occur. Instead, we propose, the self constitutes a unique contribution that is "special," that information about the

self and others is not used equally in forming IPTs. In short, people's IPTs are *egocentric*, and the covariations they presume among traits are subject to *egocentric pattern projection*.

The Egocentric Pattern Projection Hypothesis

One theme that repeatedly emerges in personality and social psychological research is that perceptions of others are often tied to impressions of the self (see Alicke, Dunning, & Krueger, 2005; Dunning, 2002, for recent reviews). Indeed, Dunning and Hayes (1996) demonstrated that people explicitly reference the self as they judge others. Other work has shown that the very criteria people use to assess traits in others seem to have their origin in information about the self (Dunning & Cohen, 1992; Dunning, Meyerowitz, & Holzberg, 1989).

Nowhere has the impact of the self on social judgment been perhaps so clearly documented than in the case of *attributive projection*. Attributive projection refers to the tendency to assume that other people commonly have the same traits as the self (Holmes, 1981). One of the first examples of the phenomenon was Allport's (1924) *illusion of universality*, in that crowd members assume other people react to a crowd leader just as they do themselves. Since then, there have been many demonstrations that people assume that others hold the same traits, attitudes, and behavioral tendencies as does the self—an assumption that has been shown to predict whether or not people see others as honest (Katz & Allport, 1931), happy (Goldings, 1954), sharing their political views (Judd, Kenny, & Krosnick, 1983), willing to wear an "Eat at Joe's" sandwich board around campus (Ross, Greene, & House, 1977), and characterized by many different personality traits (Krueger & Stanke, 2001).

However, in proposing an egocentric pattern projection hypothesis, we suggest that the impact of self on social judgment does not stop there. In all of the above cases, variation among people in their standing along a single dimension alone (e.g., an attitude) predicted their estimates of others concerning this same dimension—and that was that. But might people project not simply the traits they possess onto others (Lemon & Warren, 1974), but also the way that traits covary in the self onto their impressions of others? As an example, let's suppose that Rudy, who considers himself a creative and extroverted person, but one who is not too neat, hears that Fred is also a creative person. Rudy might take that piece of information to make other inferences about Fred—to assume that Fred is also extroverted but not so neat—just recapitulating in inferences about Fred the geography of personality that Rudy sees in himself. But similarly, if Rudy learns that Mike is far from creative, he may therefore conclude that Mike is more reserved but tidy. That is, Rudy uses the set of trait covariations that he finds in himself to make inferences about what Fred and Mike's personalities must be like.

Relation to Past Work

Past researchers have concluded that there do not appear to be predictable personality correlates of IPTs (Schneider et al., 1979), but the egocentric pattern projection hypothesis suggests that predictable individual differences in IPTs do exist. Variation in people's beliefs about how two traits will relate arise, in part, from the way people perceive two traits to co-occur in the self. If people see

themselves as high on one trait and low on a second trait, they should be more likely to assume that the traits negatively co-occur in others as well; and if the second trait is also high, then they likely assume the traits positively co-occur in others. Pattern projection therefore involves a more sophisticated process than merely seeing one's own characteristics in others. Instead, it involves forming a theory about how two variables are linked on the basis of the extent to which they align or stand in opposition within the self.

Although there is no direct evidence of the relationship between traits being projected onto others, in existing social psychological literature there is some indirect support for pattern projection phenomena, in which people link together social categories and traits. For example, in Ames's (2004) similarity contingency model of projection, he proposes that people project their own preferences and characteristics onto others who seem in some overall way to be similar to the self, but they rely on nonegocentric stereotypes in forming impressions of those who are dissimilar. For example, after focusing on similarities between themselves and MBAs, participants in Ames' studies projected their own traits onto estimates of how MBAs would respond to various dichotomous questions. However, after focusing on differences between themselves and MBAs, participants set their self-concepts aside and used their stereotype of the typical MBA to make social inferences.

Ames's (2004) model is similar to our own in that people project onto those who pass some initial criterion of similarity, but the pattern projection hypothesis differs in two critical ways. First, Ames's model predicts that inferences are drawn given others' initial, overall perceived similarity to the self. We propose instead that pattern projection can occur on the basis of less central, more specific observations of similarity or dissimilarity (e.g., that person is extroverted, just like me). Second and most important, Ames suggests that the self is involved in judging only similar others, whereas we predict that the self may also be involved in judging dissimilar others.

More consistent with the pattern projection hypothesis, there is limited evidence that people display an *opposite* heuristic in judging outgroups, differentiating an outgroup from an ingroup on a dimension in question (Cadinu & Rothbart, 1996). That is, people take one characteristic (that group is different from me) and use it to project other characteristics (i.e., what traits my group is not). The evidence for such an opposite heuristic is inconsistent, given that correlations between self judgments and outgroup judgments are typically small but positive (Krueger, 2007; Robbins & Krueger, 2005), with negative correlations emerging under only highly specified conditions (Riketta & Sacramento, 2008). Regardless, once again, the emphasis in this work is on the impact of group membership on social inference, not on how people might use specific trait information to inform their inferences about another person. It may be much easier to believe that someone's different group membership causes them to be different on any number of subsequent positions or attitudes, but what about hearing that a person differs from one along only a single trait? To what extent would that cause people to use the geography of the self to infer the personal geography of another individual?

The present research, in addition to demonstrating a new way in which the self informs social judgment, was designed to speak to a recent critique of the egocentrism literature. Karniol (2003)

proposed a self-as-distinct model, whereby judgments of others are not made egocentrically by consulting the self but rather are made protocentrically by consulting a general person prototype, or *protocenter*, some sort of model about how people are in general. This model attempts to account for past evidence of projection by saying both self and social judgments are made by consulting this same protocenter, thereby producing correlations between the two even if the self is not consulted directly in judgments of others.

Thus, in our studies, we strove to examine whether it is the self that uniquely contributes to the patterns of trait projection we observed. We did so by comparing the similarity of people's trait inferences not only to the self but to acquaintances as well—in our studies, the participants' randomly assigned roommates. If people infer egocentrically only because they consult a protocenter, as Karniol (2003) suggests, then the similarity of people's trait inferences should be equally similar to the impressions they hold of self and roommate. However, to the extent that people exclusively use the landscape of their own personality to infer the personality of others, then the relationship between trait inferences and self-concept should be greater than the similarity of trait inferences and impressions of the roommate.

In addition, in two of our studies, we further tested whether the self is causally tied to IPTs by manipulating participants' self-concepts to determine whether there would be an accompanying shift in their IPTs. If such manipulations had an impact on IPTs, this would suggest that people base their prototypical impressions (IPTs) on the self.

Overview of the Present Studies

Five studies tested whether pattern projection informs IPTs and social judgments of novel social targets, distinguished the inferences we observed from instances of attributive projection, and explored whether views of the self (as opposed to an other) uniquely cause these differences in IPTs. Study 1 tested the pattern projection hypothesis by examining whether variability in participants' IPTs was predicted by differences in the way the traits co-occur within the self. Study 2 tested whether people apply egocentric IPTs in judging specific other people. Study 3 tested whether people continue to pattern-project even after being prompted to spend several minutes forming more complete impressions of novel social targets. Both Studies 1 and 3 also tested whether this process is uniquely egocentric by determining whether the personality of another sample of one, each participant's freshman-year roommate, also related to variation in participants' own IPTs.¹ Studies 4 and 5 tested whether the self-concept plays a causal role in generating IPTs by manipulating participants' self-views and examining whether that influenced their IPTs.

Study 1

In Study 1, we tested the hypothesis that participants' beliefs about how traits co-occur in others are patterned on how they tend to co-occur in the self. We asked participants to rate themselves and their freshman-year roommates on 11 traits. Participants also estimated the percentage of people in the general population who possessed each trait. Finally, they estimated the conditional probabilities that people would possess a particular trait if they showed

evidence of possessing another. From these population estimates, we could assess participants' IPTs by calculating a proxy for the perceived correlation between traits, that is, how many people were believed to possess both traits compared with what would be expected if there were no perceived relationship between the two traits.

We chose participants' freshman-year roommate as a comparison projection source for two reasons. First, freshmen were randomly assigned to their freshman-year roommates so that this would reduce the possibility that the comparison person was actually similar to the participant, increasing our power to detect an egocentric effect. Second, the roommate would be a person about whom our participants would likely have well-individuated impressions. As such, the potential way in which pattern projection may have influenced participants as they formed (potentially false) expectations of their roommates' personalities would likely have been watered down as they gained new information about the roommate over the course of their year living together (Krueger & Stanke, 2001).

We predicted that to the extent that two traits occurred to a similar extent in the self, participants would believe the two traits were positively correlated. To the extent that the two traits were "far apart" in the self, participants would believe the two traits to be more negatively correlated. Because we expected these IPTs to be egocentric, we expected that (a) the relationship between self and IPT would be greater than that between roommate and IPT, and we expected more tentatively that (b) there would not be a relationship between ratings of the roommate and one's IPTs after controlling for such trait relationships in the self. In short, we expected evidence of egocentric pattern projection from the self but not similar projection from the roommate.

Method

Participants and Design

Eighty-nine undergraduates at Cornell University participated in the study in exchange for extra course credit or \$2.50. The study was run in two parts, with participants completing a 15-min unrelated study in between. Participants were randomly assigned either to make their personality judgments in the first part and offer their IPTs in the second part or to complete the tasks in the reverse order.

Self- and Roommate-Judgments

We randomly sampled 11 personality traits from the middle 100 (on the basis of their likeability) of the 555 traits that N. H. Anderson (1968) studied. We decided to use traits that were fairly neutral in valence because we expected to get the most variance in ratings from such descriptors. The 11 traits chosen were as follows: idealistic, perceptive, generous, wordy, resigned, bashful,

¹ We often refer to people relying on the way that traits exist or co-occur in the self or in someone else. It is worth noting that because traits are indirectly inferred rather than directly observed, people are essentially relying on their *perception* of their own or others' traits. Thus, when referring to traits existing in the self or in someone else, we mean the way people *believe* those traits to exist in the self or in someone else.

reserved, prideful, considerate, persistent, dependent. These traits were inserted into the questions “Are you _____?” and “Is your freshman year roommate _____?” and participants rated whether they themselves or their freshman-year roommate “would be considered to possess” these traits on scales that ranged from 1 (*not at all*) to 11 (*extremely*). In this way, the low end point of the scale should have been interpreted as the opposite of the trait. For example, responding *not at all* to the question “Are you bashful?” communicates that you consider yourself quite assertive. The traits were presented in a single random order for the self and a different single random order for the roommate. We counterbalanced whether participants rated themselves or their roommate first.

Across 11 traits, there are 55 trait pairs. It is of course difficult to define *covariation* in a sample of one, though we have hypothesized that people essentially do this by assessing whether the two traits co-occur in the self or whether they occur in opposition in the self. For each trait pair, we computed a difference score for both self judgments and roommate judgments. The greater the absolute value of the difference score, the more we predicted that the participant would hold the IPT that the two traits are negatively correlated. For example, if a participant rates herself as a 10 on prideful and a 3 on bashful (for a difference score of 7), we would predict that she would most likely hold the IPT that pridefulness and bashfulness are negatively correlated. In contrast, if she sees herself as a 9 on generous and a 10 on dependent (for a difference score of 1), we would predict she is more likely to hold the theory that generosity and dependence are positively correlated.

Implicit Personality Theories

In measuring IPTs, it is not realistic to expect all participants to be able to provide correlation coefficients. Accordingly, we devised the following method to derive participants' IPTs indirectly. First, we provided participants with half of a 10×11 matrix, in which each column represented each of the traits and each row represented each of the traits (except one). In each of the 55 boxes, participants answered the question “If someone is [row trait], then how likely is it that he or she is [column trait]?” by providing a percentage between 0 and 100, inclusive.² Then, for each of the 11 traits, we asked participants what percentage of people in general possess the trait.

To compute an IPT for a given pair of traits (A and B), we first computed what percentage of people the participant believed possess both traits by multiplying the judgment of the conditional probability $p(A|B)$ by the judgment of the marginal probability $p(B)$. Next, we computed what percentage of people the participant would expect would possess both traits if there were no correlation between the two traits by multiplying $p(A)$ by $p(B)$. We then subtracted the second product from the first to get a measure of the participant's IPT. Higher values suggest higher perceived correlations, since the value reflects the extent to which the participant expects A and B to co-occur more often than would be expected by chance. As an example, assume that Marcus estimates that if a person is wordy, he or she has a 10% chance of also being persistent. Also, Marcus believes that only 1% of people are wordy and 15% of people are persistent. According to our equation, Marcus has an IPT that persistence and wordiness are negatively correlated: $(.1)(.01) - (.15)(.01) = -.0005 < 0$.

Procedure

Half of participants completed the personality judgments, while the other half completed the IPTs section. Then all participants completed a 15-min study on a topic unrelated to self-perception or social perception. Finally, participants completed the section they did not complete in the first part. After the experiment, participants were debriefed with a funneled debriefing procedure (cf. Chartrand & Bargh, 1996). Other than noting that they made judgments about the same 11 traits in the two parts of the experiment, participants did not make guesses about the experiment's purpose that were close to our actual hypotheses.

Results

We conducted our analyses in two ways: within subject and within trait pair. The within-subjects analysis tested whether variation in each participant's IPTs corresponded to variations in the size of the difference between self-ratings and roommate-ratings along any two traits. A within-trait-pair analysis tested for each of the 55 trait pairs whether those for whom the components of the trait pairs were rated more similarly had IPTs suggesting the two traits were positively correlated and alternatively whether those for whom the components of the trait pairs were rated more dissimilarly had IPTs suggesting the two traits were negatively correlated. The results of the analyses are summarized in Table 1; details on the approaches are presented below.

Within-Subjects Analysis

For each participant, we regressed the participant's 55 IPTs on the corresponding difference scores from both their self-judgments and their roommate judgments. Because smaller difference scores are hypothesized to predict positive-correlation IPTs, we multiplied the standardized betas from the regression analyses by -1 such that positive betas reflect projection from the self or the roommate. Participants' IPTs were strongly related to the ways the different pairs of traits related in the self ($M = .14$, $SD = .185$), $t(87) = 7.10$, $p < .001$. Their IPTs were also related to the ways the pairs of traits related in their roommates ($M = .08$, $SD = .200$), $t(87) = 3.80$, $p < .001$. However, the betas for the self were greater than the corresponding betas for the roommate. Given that the distribution of self minus roommate beta difference scores was bimodal ($z = 3.98$, $p < .001$), we used a Wilcoxon signed-ranks test, which confirmed that there was more pattern projection from the self than pattern projection from the roommate ($z = 2.06$, $p = .04$). Also, the size of the egocentric pattern projection effect did not depend on whether participants completed their IPTs before or after the personality judgments, or whether they rated themselves or their roommate first (all F s < 1.88 , p s $> .18$).

² Note that we could have had participants complete the entire matrix, offering both conditional probabilities $p(A|B)$ and $p(B|A)$, where A and B represent the given pair of traits. Although having participants state both conditional probabilities might have allowed us to compute a more reliable measure for the IPT, we felt that the added error stemming from the fatigue of providing an additional 55 judgments would offset the potential benefit.

Table 1
Average Standardized Betas for Self and Roommate Difference Scores by Analysis Type (Study 1)

Difference score	Within subjects	Within trait pair
Self	.14*	.09*
Roommate	.08*	.02

Note. The betas in each column differ at $p < .05$.
* $p < .001$.

Within-Trait-Pair Analysis

Although our first analyses demonstrated that there was evidence of pattern projection from both self and roommate, this could be because variation across each participant's IPTs was at least in part driven by variation in the way that these traits actually relate in the real world (and thus in the roommate as well as the self). To help to circumvent this issue, we conducted a regression analysis separately for each of the 55 expressed trait covariation ratings, with the self and roommate difference scores as simultaneous predictors in each analysis. This method partially controls for variation due to real differences in the way different trait pairs are actually likely to relate. This more conservative analysis once again yielded evidence of pattern projection from the self ($M = .09$, $SD = .121$), $t(54) = 5.42$, $p < .001$. However, IPTs no longer related to perceptions of one's roommate ($M = .02$, $SD = .123$), $t < 1$. Once again, there was evidence that egocentric pattern projection was stronger than pattern projection from the roommate, $t(54) = 3.11$, $p = .003$.³

Discussion

The results of Study 1 demonstrated that participants' IPTs are related to the patterning of traits in the self. Using two different data analytic approaches, we found that participants engage in pattern projection from the self, and they did so to a greater extent than from another sample of one, their freshman-year roommates. Although the within-subjects analyses indicated evidence of projection from the roommate, within-trait-pair analyses suggested that this relationship may have emerged as an artifact of actual differences in the way different traits are likely to relate. Also, the size of projection did not depend on whether participants had already made the self- and roommate-ratings or not. This suggests that even after making another person salient (one's roommate), people were no less likely to rely on the self in stating IPTs.⁴

Study 2

Although the results of Study 1 were entirely consistent with the egocentric pattern projection hypothesis, the question remains whether these egocentric hypotheses will actually be applied when forming expectations and judgments of specific other people. It is possible that when answering a series of questions demanding marginal and conditional distributional probabilities, the novelty of the task may have left participants overwhelmed. Perhaps they

coped with this difficulty by relying on a readily available exemplar, the self.

The task of forming impressions of others is a task that people confront in their day-to-day lives and is a process people are much more familiar with than estimating distributional descriptive statistics. Thus, support for the pattern projection hypothesis, and the generality of its implications, would be greatly advanced if impressions of novel targets were guided by pattern projection as well. Thus, in Study 2 participants received a Likert-scale trait rating for each of 36 targets that was one standard deviation either below or above the average roommate ratings from Study 1. We then had participants judge the target on a second trait. We predicted that when judging a target who was high on a trait, participants would judge the target as higher on the second trait to the extent the two traits co-occurred in the self, and alternatively they would judge the target as lower on the second trait to the extent the two traits occurred in opposition in the self. The reverse pattern was predicted for targets low on a provided trait.

³ It is instead possible that evidence of egocentrism could emerge simply because there was greater variance in self-ratings than roommate-ratings. This might emerge if participants were more tentative in their ratings of the roommate and more likely to have clear trait impressions of the self. If there were less variation in roommate-ratings than self-ratings, a restricted range of judgments could depress the beta weights for the roommate, artifactually yielding evidence of egocentrism. Contrary to this explanation, the standard deviation of roommate-ratings ($M = 2.52$) was on average greater than that of self-ratings ($M = 2.09$), paired $t(10) = 5.43$, $p < .001$. In Study 3, we also found that the standard deviation of roommate-ratings ($M = 2.48$) was greater than that of self-ratings ($M = 2.03$), paired $t(16) = 5.40$, $p < .001$. Although it is not immediately clear why there was more variability in roommate-ratings, it is important to note that the smaller range of self-ratings, if anything, made it harder to observe evidence of egocentrism.

⁴ We also tested whether there was evidence that people perceived the same patterns of trait covariances in themselves and in their freshman-year roommate. For each trait pair, we regressed the difference score for the roommate-ratings on the appropriate difference score for the self-ratings. Indeed, there was strong evidence of pattern projection from the self to the roommate ($M = .190$, $SD = .131$), $t(54) = 10.72$, $p < .001$. In Study 3, we also see strong evidence of pattern projection from the self to the roommate ($M = .176$, $SD = .076$), $t(135) = 26.84$, $p < .001$. Thus, even once additional information was known about a target (e.g., individuating behaviors, group memberships), pattern projection remained. Because participants were randomly assigned to their freshman-year roommates, this reduces the likelihood that such pattern projection occurred because the roommates' trait covariances were actually similar, although we cannot rule out the alternative explanation that participants may have grown either more similar or more complementary over the course of the semester. As such, accurate social perception would look like pattern projection. But to the extent that participants grew more similar on certain traits and more complementary on other traits, this would disrupt pattern projection. Thus, while we believe that these results are suggestive that pattern projection exists not only in expectations but in perceptions of well-individuated others, future research is needed to conduct a more rigorous test of this hypothesis. Regardless of what causes this similarity, it does speak to just how conservative our main analyses are, given that they control for the way traits are perceived to relate in the roommate.

Method

Participants and Design

One hundred twenty-six undergraduates at Cornell University participated in exchange for extra course credit or \$2.50. The study was run in two parts, with a 15-min unrelated study conducted in between. Some participants completed self-judgments in the first part and target judgments in the second part. For other participants, this order was reversed.

Novel Target Judgments

Participants were told that the first phase of the study took place in one of the residence halls on campus. Supposedly, all the residents on a hall floor had rated each other on a number of personality traits. To lend validity to the cover story, we asked participants to alert us if they had participated in the first part of the study. We told participants that we were interested in how accurately they could guess details of these residents' personalities from minimal information.

First, we used the roommate-ratings from Study 1 to determine what scale ratings corresponded to one standard deviation above and below the mean roommate-rating for each trait. We then randomly chose 36 of the trait pairs used in Study 1. For each, we randomly selected one of the traits to be the provided trait. Depending on the version, participants learned that each resident was high or low on the provided trait by learning that the average rating the particular resident had received from his or her peers was the number that corresponded to one standard deviation either above or below the mean. For each of the two versions of this task, approximately half of the targets were high on the provided trait, and half were low. Then, participants were asked to estimate how the target was likely rated on a second trait. As an example, one item read, "Person J received an average rating of 9 on the trait *prideful*. How BASHFUL is person J?" and "Person J received an average rating of 4 on the trait *prideful*. How BASHFUL is person J?" Participants circled an answer on a 1 (*not at all*) to 11 (*extremely*) scale.

Procedure

Half of participants completed the target judgments, while the other half rated themselves on the same 11 personality traits as in Study 1. At this point, all participants completed a 15-min study on a topic unrelated to self-perception or social perception. Then, participants completed the section they did not complete in the first part. No participant expressed suspicion regarding the actual purpose of the study.

Results

Within-Trait-Pair Analysis

For each of the versions of each of the 36 targets, we regressed the participants' trait judgments on the relevant self-difference scores. According to the pattern projection hypothesis, when a target is low on a trait, we would expect the perceiver to see the target as high on the judged trait to the extent that the difference score between the traits in the self is large. Therefore, we expected the standardized betas from the regressions to be positive when the

target was low on the provided trait. When a target is high on a trait, we would expect the perceiver to see the target as low on the judged trait to the extent that the difference score between the traits in the self is large. We multiplied the betas from these latter, high-target regressions by -1 , such that for all analyses, a positive coefficient was predicted.

Across all analyses, we found weak support for the pattern projection hypothesis, with the average standardized beta marginally significantly greater than 0, ($M = .03$, $SD = .131$), $t(71) = 1.77$, $p = .08$. Unexpectedly, we found that the standardized betas differed depending on whether the trait was high or low in the target, paired $t(35) = 3.44$, $p = .002$. Accordingly, we conducted our analyses on the two sets of regression analyses separately. We found strong support for the pattern projection hypothesis when the target was high in the provided trait ($M = .08$, $SD = .127$), $t(35) = 3.66$, $p = .001$. By contrast, we found no evidence of pattern projection when the target was low on the provided trait ($M = -.02$, $SD = .116$), $t(35) = -1.20$, $p > .23$.

Within-Subjects Analysis

Given the unexpected moderation by provided trait level and the fact that participants had approximately half high targets and half low targets, we conducted the within-subjects analysis with judgments for only targets who were high on a given trait. Thus, for these 17 or 19 targets (depending on which version participants completed), we regressed the target judgment on the relevant self-difference score. Because a larger absolute gap between the traits should be associated with a lower rating of the target, we multiplied the standardized betas by -1 so that positive betas were hypothesis-consistent. Using this between-trait-pair approach, we once again found evidence of pattern projection ($M = .06$, $SD = .295$), $t(123) = 2.12$, $p = .04$. As in Study 1, the size of this effect did not depend on whether one judged the self or the novel targets first ($F < 1$).

Discussion

Study 2 provided some support for the pattern projection hypothesis. People not only hold IPTs that personality traits covary in the way they relate in the self, but their judgments of others also reflect these egocentric patterns. Although not predicted, this pattern emerged only for targets who were high on a given trait and not for those who were low on that trait. The pattern projection hypothesis does not predict this asymmetry. However, participants may not have interpreted the low information in the way that we intended. Participants may have interpreted the low number on the provided trait not as low but rather as uninformative. That is, participants may have seen the low information as "not all that X" instead of the way we intended it, as "the opposite of X." For example, "Person J was rated a 4 on *pridefulness*" may have been interpreted as "Person J is not all that proud," a potentially more neutral sentiment than the intended "Person J is a pretty humble person." To address this concern, in Study 3 we offered more detailed descriptions of targets than simply a number, such that there would be no ambiguity in understanding what it meant to be low on a trait. In addition, we had participants rate their roommates as well, to test whether pattern projection was egocentric.

Study 3

The goal of Study 3 was to provide a better test of whether judgments of novel targets show evidence of egocentric pattern projection. Without a theoretical explanation for why participants in Study 2 would pattern-project onto targets high on a trait but not those low on a trait, we changed the methodology of Study 3 to determine whether this moderation was an artifact of the design. Participants read a few sentences that had supposedly been written about each of two targets. For one target, the description was of either a very idealistic or a not-at-all-idealistic person. The sketches of the second target described someone who was very resigned or not at all resigned. If participants in Study 2 were not spontaneously thinking about a low-trait target in Study 2 as a target who actually possessed the opposite trait, then this ambiguity should have been resolved in Study 3, in which we expressly described targets in terms that were highly reflective of the provided trait or the opposite of the provided trait.

In addition, we once again included a measure of the perceived personality of one's freshman-year roommate to test whether pattern projection was egocentric. We predicted that in forming a trait judgment about a target who was high on a provided trait, the closer the two traits occurred in the self, the more one would judge the target high on the second trait, and that for a target who was low on a provided trait, the closer the two traits occurred in the self, the more one would judge the target low on the second trait. We did not expect the same correspondence between roommate and target judgments. Finally, because of our more precise operationalization of a target who is low on a trait, we did not expect to observe a difference in the degree of pattern projection onto high or low targets.

Method

Participants and Design

One hundred fifty-nine undergraduates at Cornell University participated in exchange for extra credit in psychology or human development courses. Participants were randomly assigned to read about either a very idealistic or a not-at-all-idealistic target and either a very resigned or a not-at-all-resigned target. Which version of the first target participants received was independent of what version of the second target they received.

Targets

Participants were told that they would read a few sentences that were written about two different people. The target descriptions were as follows:

Very idealistic: "One of the core aspects of [his/her] life is [his/her] sincere belief that the individual has an underappreciated power to effect change in the world. [S/he] often complains that more of us should pursue those principles we most cherish, whatever they be."

Not at all idealistic: "One of the core aspects of [his/her] life is [his/her] sincere belief that the individual has an exaggerated power to effect change in the world. [S/he] often complains that too many people have an unrealistic sense of their

ability to promote their principles and ideals without an appreciation of practical limitations that accompany any such quest."

Very resigned: "In many ways, [his/her] attitude toward life is characterized by a certain acquiescence. [S/he] often mentions the importance of accepting one's fate."

Not at all resigned: "In many ways, [his/her] attitude toward life is characterized by an insistence that we must never acquiesce. [S/he] often mentions that there is no such thing as 'fate,' that we must always strive to overcome whatever suboptimal destiny awaits us."

In order to pretest the descriptions, we gave 10 people all four descriptions and asked them to choose which target was very idealistic, not-at-all idealistic, very resigned, or not-at-all resigned. Each target was correctly classified by at least 9 of the 10 pretest participants.

Procedure

The study was run in two parts, separated by a 15-min study unrelated to self-judgment or social judgment. Participants completed the two parts in a random order. In one part, participants rated themselves and their freshman-year roommate on 17 traits. Participants rated themselves and their roommates on the 11 traits used in Studies 1 and 2 plus these six traits: extravagant, skeptical, prudent, opportunistic, cunning, happy-go-lucky. As before, all ratings were made on 11-point scales that ranged from 1 (*not at all*) to 11 (*extremely*).

In the second part, participants first read either the *very idealistic* or the *not at all idealistic* description. Immediately after the description, participants were to describe the target by circling either *not at all idealistic* or *very idealistic*. Then, participants were asked to take a few minutes to form a more complete impression of person A. They were prompted to "go with their instincts" in formulating an idea of how the person behaved around his or her friends, family, classmates, and superiors. It was stressed that it was more important "to develop a rich portrait of what the person is like than a vague sketch that says very little." After spending several minutes writing notes on their more complete impression of the target, participants rated the target on all of the traits except idealistic. Participants then repeated this process for either the very resigned or the not-at-all-resigned target. They rated this target on all traits except idealistic and resigned.

Results

Manipulation Checks

Despite a reasonably low error rate in pretesting, participants misidentified 17.0% of the targets. Given this substantial error rate, we analyzed the data two ways. First, we excluded participants' target judgments when they misidentified the target and performed all analyses on the remaining data. But in debriefing, it became apparent that at times people misidentified targets due to confusion about the definition of the traits. However, as long as participants were using this same (wrong) definition in judging the self, roommate, and target, this would not be problematic. Thus, we con-

ducted the analyses a second way by placing participants in the target condition that they *believed* they were in, not the one they were actually assigned to. In other words, participants who believed they were rating the very resigned target, even though they read about the not-at-all-resigned target, were included with those who accurately identified that they were rating the very resigned target.

Within-Trait-Pair Regressions

First, we computed self and roommate difference scores by computing the absolute value of the difference in self- or roommate-ratings between idealistic, resigned, and each of the remaining 15 traits. Then, we excluded the trait ratings for misidentified targets. For each of the trait ratings about each of the four targets, we regressed participants' trait ratings on the relevant self and roommate difference scores. As in Study 2, we multiplied the standardized betas by -1 for the *very* targets, so that positive betas were hypothesis-consistent.

Second, we tested whether there was evidence of pattern projection. Indeed, the average standardized beta from the self judgments ($M = .07$, $SD = .144$) was significantly greater than 0, $t(61) = 3.99$, $p < .001$, suggesting there was evidence of pattern projection. As can be seen in Figure 1, this projection did not depend on whether the target was high or low on the trait, paired $t(30) = .36$, $p > .72$. There was significant evidence of projection both when the target was high on the trait ($M = .07$, $SD = .134$), $t(30) = 2.73$, $p = .01$, and when the target was low on the trait ($M = .08$, $SD = .155$), $t(30) = 2.87$, $p = .01$.

Third, we tested whether this pattern projection was egocentric. As predicted, there was greater evidence of projection from the self than from the roommate ($M = .02$, $SD = .139$), paired $t(61) = 2.19$, $p = .03$. Conceptually replicating Study 1, there was no evidence of projection from the roommate to the target ($t < 1$).

We conducted the analyses once again including all participants. We classified each set of target ratings by participants' response to the manipulation check, not the description they actually read. The results were essentially identical. There remained evidence of pattern projection from the self, $t(61) = 3.98$, $p < .001$. The projection did not depend on whether the trait was present or absent in the target (paired $t < 1$). Not only was the degree of

projection greater than induction from the roommate, $t(61) = 2.30$, $p = .02$, but there was no projection from the roommate ($t < 1$).

Discussion

The results of Study 3 demonstrated that participants' trait judgments of a novel social target showed evidence of pattern projection from the self. Although participants in Study 2 appeared not to pattern-project to targets who were low on a given trait, participants in Study 3 showed just as much pattern projection to targets who were high on a trait as to targets who were described as the opposite of a trait. In addition, the results of Study 3 suggest that the application of egocentric personality theories not only holds for snap judgments but continues even after engaging in several minutes of more effortful thinking about a target.

Study 4

Although Studies 1 through 3 provided evidence that IPTs are egocentric in origin and that such theories are applied in making inferences about social targets, all three studies are correlational. As such, they do not demonstrate that the self plays a causal role in the construction of IPTs. Thus, the final two studies manipulated views of the self and of another person to test the causal hypothesis that in forming IPTs, people egocentrically refer to themselves more than to others.

Most evidence from the attributive projection literature suggests that it is perceptions of our own characteristics that are projected onto others or the group (Bauman & Ennett, 1996; Biernat, Manis, & Kobrynowicz, 1997; Clement & Krueger, 2000; Epstein & Baron, 1969; Granberg & Brent, 1983; Sherwood, 1979), not the reverse process of introjection or self-stereotyping (Krueger, 2000). If pattern projection is simply pattern introjection—in which the assumed covariation between two traits guides the way people form impressions of their own personalities—then experimentally manipulating participants' self-views should not influence their IPTs. Instead, if the self plays a causal role in the construction of IPTs, changing the way people view their own personalities should cause them to shift their IPTs accordingly. Thus, in Study 4, participants received false feedback about where either they or a previous participant fell along two novel personality dimensions: *V/Z dominance* and *front/back brainedness*. We expected that when receiving feedback about the self, people would form a theory that the personality types likely correlate in a way suggested by their self-classification. In other words, *V/front* individuals should be more likely to assume that *V* goes with *front* and *Z* goes with *back*.

In addition, while the first three studies provided evidence of pattern projection that cannot be accounted for by mere attributive projection, the design of Study 4 also allowed us to more clearly distinguish the type of projection we studied here, pattern projection, from attributive projection. Our proposal is that participants should infer a relationship between *V/Z dominance* and *front/back brainedness*, thus seeing the two characteristics as being correlated. For example, participants who learned that they were *V/front* should infer an increase in the number of both *V/front* and *Z/back* individuals present in the population. By contrast, standard attributive projection in this case would not predict an increase in correlation between the two traits. It would merely predict that people would boost their estimates of *V* and *front* individuals in the population—

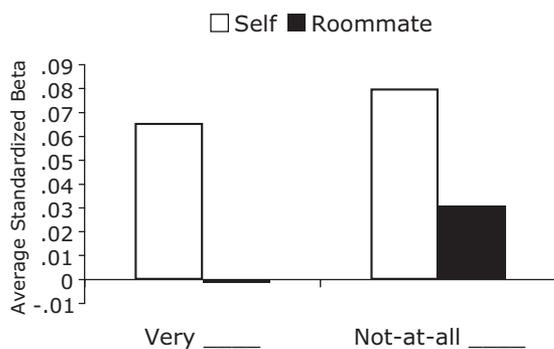


Figure 1. The average standardized beta from regressions of the relevant self and roommate difference scores predicting judgments of targets who were very or not-at-all idealistic or resigned (Study 3).

that is, in their estimates, we should see two main effects (independent rises in the estimates of V and front individuals, and independent reductions in the estimates of Z and back individuals). In sum, this would lead to a rise in the estimate of V/front individuals that would be equally offset by a decrease in estimates of those possessing Z/back characteristics—a result that is quite distinct from our pattern projection hypothesis.

Finally, we also expected to find that pattern projection was egocentrically driven by self-information and that learning the feedback from a past participant would not affect participants' IPTs.

Method

Participants and Design

One hundred sixty-eight Cornell University undergraduates participated in the study in exchange for extra course credit. The design consisted of a 2 (self or peer) \times 4 (feedback pairing: V/front, V/back, Z/front, Z/back) factorial design. Participants were randomly assigned to condition.

Personality Test and Feedback

We constructed a 46-item true–false personality test by choosing and slightly modifying a random assortment of items from the Myers–Briggs Type Indicator (Myers & McCaulley, 1985). We also constructed two fictitious personality dimensions along which we delivered false feedback to participants. The first dimension was called V/Z dominance; the second dimension was front/back brainedness. The descriptions were written to capitalize on the *Barnum effect*, the tendency of people to believe that vague personality descriptions that have supposedly been tailored to the individual do in fact provide an accurate read of the person (Dickson & Kelly, 1985; Forer, 1949).

V dominance was characterized by a consistency in personality across situations (i.e., “such people fulfill a somewhat consistent role in social groups”). Z dominance was said to be reflected in those who fulfill different roles with different people (i.e., “playing more involved roles when they feel more comfortable, but becoming more passive or indifferent when they have a less solid footing”). Front-brained individuals were supposedly attentive to details and subtleties. Such individuals supposedly “note not only the focal person in a social situation, but the reactions of those less involved as well,” “have fairly nuanced views of themselves and the world,” and “are left wanting to know more about situations of which they only have a fuzzy grasp.” Back-brained individuals were said to be more likely to go beyond details to make broader level inferences about the world. They focus more on “broader meaning at the expense of subtlety” and see “not just a shove, but an *act of aggression*.” Each description was supplemented with several descriptions with which we expected most participants would resonate.

Procedure

Participants began the experimental session by completing our 46-item true–false personality test, after which the experimenter collected the test. Then, participants completed a 15-min experiment that was unrelated to self-judgment or social judgment. In this way, participants would have neither access to the questions

nor a good memory for them when they received their personality profiles.

Those in the self-condition were told that they would complete a computer program that would give them instructions on scoring their personality responses. Those in the peer condition were told that although participants were not allowed to score their own personality responses, they would score the responses from a participant who participated the day before. For these participants, the experimenter collected their responses and gave them a photocopy of what was supposedly a previous participant's responses. The true–false responses on this page had been generated randomly, and this supposed participant's participant number was written in the top right corner of the page.

To increase the perceived validity of the scoring algorithm, we had the computer program guide participants to complete multiple steps in entering their own or the previous participant's responses. First, the computer provided four clusters of question numbers. Participants were to total up how many items within each cluster had been marked as “True.” At the bottom of their response sheet in a section labeled *For scorer's use only*, there was a place for participants to write down how many true responses they had for each cluster. On the next screen of the program, the computer asked them to indicate whether there were more true responses in Cluster 1 or Cluster 4, or whether the number was the same. Next, participants were to respond whether there were more true responses in Cluster 2 or Cluster 3, or whether the number was the same. On the last page, feedback was provided. One of the four possible types—V/front, V/back, Z/front, Z/back—was randomly chosen for each participant. Thus, the participants' responses did not affect which personality type they were assigned. Participants were to record on a provided page which of the four personality types they or the former participant was assigned.

At this point, participants were prompted to read all four personality descriptions. Then, they were to fill in the boxes of a 2 \times 2 matrix, with row labels *V dominant* and *Z dominant* and column labels *Front-brained* and *Back-brained*, with their estimates of what percentage of the population would be categorized as each of the four types. It was noted that the four judgments should add up to 100%. At this point, those in the self condition were asked, “To help us refine the personality inventory, how accurate was your profile?” Responses were provided on a 7-point scale from -3 (*completely inaccurate*) to 3 (*completely accurate*). Those in the peer condition were asked instead to indicate which of the four personality types best reflected their own personalities.

Results

Manipulation Check

To make certain that the feedback was successful in manipulating self-views, we tested whether participants in the self condition found the feedback to be valid. The feedback, despite being randomly assigned to participants, was perceived as accurate ($M = 1.3$), $t(88) = 9.32$, $p < .001$, and did not vary in its perceived accuracy among the four possible types, $F(3, 85) = 1.57$, $p > .20$.

Implicit Personality Theories

Mere attributive projection predicts that participants should project each of the personality types independently. This predicts

that they should see more people of the same personality type as their own (similar on both types) but fewer people of the exact opposite personality type (dissimilar on both types). Their estimates for the other two types (similar on one type, dissimilar on the other) should remain relatively unchanged. By contrast, the pattern projection hypothesis predicts that people should see (a) more people who are either exactly similar to or exactly dissimilar to themselves and (b) fewer people among the other two types.

To test the level of pattern projection that each participant displayed, we summed their estimates of V/front and Z/back (main diagonal) and subtracted their estimates of V/back and Z/front (alternate diagonal⁵). According to standard attributive projection, this quantity should not differ between conditions. But according to pattern projection, the composite should be greater when participants are told they are either V/front or Z/back than when they are told they are V/back or Z/front.

Self-feedback. To test the pattern projection hypothesis, we first coded participants in the self condition as to whether they were V/front or Z/back (+1) or whether they were V/back or Z/front (-1). Consistent with the pattern projection hypothesis, the V/front and Z/back individuals estimated that relatively more people would lie along the V/front–Z/back diagonal ($M = 54.8\%$, $SD = 13.58\%$) than did those whose feedback placed them along the V/back–Z/front diagonal of the matrix ($M = 49.3\%$, $SD = 9.81\%$), $t(78.2) = 2.20$, $p = .03$ (see Table 2). Because it seemed possible that the effect should be stronger to the extent that participants saw their feedback as more accurate, we regressed the composite on the diagonal, perceived accuracy, and Diagonal \times Perceived Accuracy interaction. The effect of the diagonal remained significant, $t(83) = 2.64$, $p = .01$. The Diagonal \times Perceived Accuracy interaction, while in the expected direction, emerged in trend only, $t(83) = 1.56$, $p > .12$.

Peer-feedback. To test whether there was pattern projection from the past participant in the other condition, we again regressed participants' main diagonal percentage estimates on whether the past participant lay on the main diagonal, V/front–Z/back (+1), or on the alternate diagonal, V/back–Z/front (-1). As can be seen in Table 2, there was no evidence of pattern projection from the peer, ($M_s = 50.9$ vs. 49.2), $t < 1$. The mean estimates, collapsed across feedback conditions, for the feedback cell, the opposite cell (the one that lay on the same diagonal as the feedback cell), and the average of the two off-diagonal cells, are presented for the self- and peer-feedback conditions in Table 3.

Table 2
Results of Linear Regression Predicting Implicit Personality Theories (% Along Main Diagonal) by Feedback Condition (Study 4)

Feedback condition	β	t^a	d
Self			
Self-diagonal	.27**	2.64	0.57
Accuracy	.25*	2.26	0.50
Self-Diagonal \times Accuracy	.17	1.56	0.34
Peer			
Peer-diagonal	.09	0.77	0.18
Self-diagonal (unmanipulated)	.26*	2.37	0.54

^a $df = 83$ for self and 76 for peer.
* $p < .05$. ** $p < .01$.

Table 3
Percentage of People Believed to Be Classified by Each Personality Type, as a Function of Feedback Condition (Study 4)

Feedback condition	Feedback cell	Opposite cell	Off-diagonal
Self	27.8 _a	25.0 _{a,b}	23.6 _b
Peer	28.1 _a	22.7 _b	24.6 _{a,b}

Note. Opposite cell = the other cell on the diagonal with the feedback cell. Off-diagonal = the average of the two cells not on the feedback diagonal. Means in the same row that do not share a subscript differ at the $p < .05$ level.

After participants in the peer-feedback condition had stated their IPTs, they were asked to indicate which personality type best reflected their own personality. We then tested whether there was any relationship between the diagonal along which participants placed themselves and the diagonal on which the past participant lay. Fifty-two percent of participants placed themselves along the main diagonal, and 48% along the alternate diagonal. The peers' diagonal and the participants' self-judged diagonal were unrelated ($r = -.06$), which suggests that being exposed to past participants' feedback did not systematically influence the way participants viewed themselves. We then regressed participants' main diagonal percentage estimates on both their past participant's diagonal and the diagonal on which they placed themselves. While there remained no relationship between the past participant and participants' IPTs ($t < 1$), the way participants viewed themselves (unmanipulated) significantly predicted their IPTs, $t(76) = 2.37$, $p = .02$.

Discussion

While the initial three studies provided evidence for a correlational link between self-views and IPTs, Study 4 supports our causal hypothesis that self-views produce IPTs. When we manipulated participants' self-views through false feedback, participants estimated that the personality types "went together" in the way they co-occurred in the self. While standard attributive projection would predict that a boost in the type to which the self was assigned would be equally offset by a reduction in the type completely dissimilar to the self, we instead found evidence of pattern projection. People projected both combinations that reside on the diagonal onto which their feedback placed them.

Also, while there was no evidence of projection from a peer, the IPTs of these participants continued to be predicted by their self-views. Of course, we did not manipulate these self-views, although there was no evidence that being exposed to the previous participant's feedback affected self-judgments in any systematic way. It is somewhat surprising that while preexisting self-views predicted IPTs in the peer condition, the feedback manipulation did not interact with perceived accuracy in the self condition. This suggests that the influence of recently acquired or considered information about the self may even trump the influence of preexisting beliefs in determining IPTs. Note that even though the

⁵ The main and alternate diagonals derive from the 2×2 matrix in which participants expressed their IPTs.

fictitious types were novel, the content reflected in such self-descriptions touched domains about which participants presumably already had some preexisting self-impressions. Egocentric pattern projection, therefore, may stem less from the mere co-occurrence of information in the self and more from explanations people form in understanding themselves (or understanding feedback they get about themselves) in the moment.

Did pattern projection occur in isolation, or was there evidence of both pattern projection and attributive projection? Our test of pattern projection essentially tested whether there was evidence of an interaction in the 2×2 matrix. In contrast, the two main effects would be evidence of attributive projection. For example, did participants assigned to the Z/back feedback believe there were more Z/back and V/back people than Z/front and V/front people? To assess this possibility, we tested whether the main effects—V/Z and front/back—were significant for those in the self and other conditions separately. For the self, there was a marginally significant main effect of V/Z dominance, $t(87) = 1.88, p = .06$, and no hint of a main effect for front/back ($t < 1$). For the other condition, there was a significant main effect of V/Z dominance, $t(77) = 2.90, p = .005$, but the main effect of front/back did not reach significance, $t(76.4) = 1.23, p > .22$. Thus, there was slightly stronger evidence for attributive projection in the other-feedback condition than in the self-feedback condition, although this evidence was mixed. Although there is no reason that attributive projection and pattern projection could not both occur, it is interesting that attributive projection, a particularly robust phenomenon, became quite weak once there was the possibility of pattern projection.

Study 5

Although Study 4 provided support for the causal role of self-perceptions in guiding IPTs, Study 5 was designed to provide a more stringent test of whether this pattern projection was egocentric. In a modification of the bogus stranger paradigm (Byrne, 1961), all participants received false personality feedback about themselves as well as “the last participant to use this computer.” By varying feedback such that self-feedback was always pit in opposition to other-feedback, the experiment provides the most direct test of both our causal and our egocentric hypotheses. We used the same fictitious dimensions as in Study 4, and the feedback was rigged such that the bogus stranger was always similar to the participant on one dimension and dissimilar on the other dimension. We expected participants to estimate relatively more people would be categorized along the diagonal on which the feedback placed them than the diagonal on which the previous participant fell.

Method

Participants and Design

Four hundred thirteen undergraduates at Cornell University participated in the study in exchange for extra course credit. Participants were randomly assigned to the V/front, V/back, Z/front, or Z/back condition. Five participants expressed suspicion about whether their personality profiles were actually based on their personality test responses. Three participants provided IPTs that were more than 3 standard deviations away from the mean re-

sponse. Ten participants had missing data. These 18 participants were excluded from all analyses, leaving 395 participants in the analyses reported below.

Procedure

All participants completed the personality test used in Study 4. As before, they then completed a 15-min study unrelated to self-judgment or social judgment. At that point, they completed the computer program that would ostensibly score their own test. At its conclusion, the computer provided the participant’s feedback and what were supposedly the results from the last participant to use that particular computer. We asked participants to write down on a provided page both their own and the previous participant’s feedback, so we could “make sure that everyone recorded their own feedback correctly.” Each participant’s own feedback was always equivalent to the previous participant’s feedback on one dimension and different on the other dimension.

At that point, participants completed the 2×2 matrix that allowed them to express their IPTs. Finally, participants rated from -3 (*completely inaccurate*) to 3 (*completely accurate*) the perceived accuracy of their own feedback.

Results

Manipulation Check

Once again, participants believed that their personality profiles, despite being randomly assigned to them, were fairly accurate ($M = 1.3$), $t(394) = 21.87, p < .001$. Although the perceived validity of the feedback did not differ by condition in Study 4, there was a main effect of condition on perceived validity, $F(3, 391) = 2.63, p = .05$. This reflected that those in the V/back condition saw their feedback as less valid ($M = 1.0$) than did those in the Z/front ($M = 1.4$), $t(391) = 2.30, p = .02$, or Z/back ($M = 1.4$), $t(391) = 2.44, p = .02$, conditions. Although we do not find these differences problematic, we also tested whether the perceived validity of the feedback differed according to which diagonal the participants’ profiles fell upon, as we classified participants by diagonal for the purpose of our main analyses. The perceived validity of the feedback did not differ by what diagonal participants lay upon, $t(393) = 1.51, p > .13$.

Implicit Personality Theories

We once again split participants into a main diagonal (V/front and Z/back) or alternate diagonal (V/back and Z/front) group. Recall that whatever diagonal the participants’ own feedback lay upon, their previous participant’s feedback was located on the other diagonal. We then regressed participants’ IPTs on their diagonal, the perceived accuracy of their feedback, and the Diagonal \times Perceived Accuracy interaction. The main effect of diagonal was significant, $t(391) = 2.20, p = .03$, reflecting that estimates of how many people lay along the main diagonal were greater by those whose own feedback placed them along this diagonal ($M = 51.8\%$) than by those who lay along the other diagonal ($M = 49.7\%$). In addition, this effect was qualified by a Diagonal \times Perceived Accuracy interaction, $t(391) = 3.53, p < .001$, indicating that pattern projection became stronger as the perceived validity of one’s own feedback grew. The means, collapsed across feedback

conditions, for the self-feedback, the peer-feedback, and the two opposite cells are presented in Table 4.

Discussion

The results provided evidence for egocentric pattern projection by directly pitting manipulated information about the self against information about another person. Although in Study 4 there was evidence of pattern projection from the self without evidence of projection from another participant, the present results provided a more conservative test of whether pattern projection is egocentric. Participants were directly confronted with contradictory information about the self and another person. While participants in general found the feedback to be accurate, note that participants had much more reason to question the validity of their own feedback (given all of their preexisting self-knowledge) than they did the feedback for this other participant, about whom they had no other information. Nonetheless, there was greater evidence of projection from the self than of projection from another person.

Unlike in Study 4, there was a strong Diagonal \times Perceived Accuracy interaction. Even though our manipulation itself was successful in producing pattern projection, there was a continuing influence of people's preexisting self-views, which presumably determined whether feedback was perceived to be accurate. Although significant in Study 5 and not in Study 4, the effect sizes of the interaction terms were nearly equivalent in both studies ($d_s = 0.36$ and 0.34 , respectively), suggesting that the interaction may have been merely underpowered in Study 4. In other words, what may be more notable is the difference in effect sizes of pattern projection itself between Study 4 ($d = 0.50$) and Study 5 ($d = 0.22$). This suggests that while exposing someone to a person who lay along the opposite diagonal may have had some influence in reducing pattern projection, it was not sufficient to eliminate it.

Given there was no evidence of projection from a roommate (Studies 1 and 3) or from a previous participant (Study 4), it may seem surprising that information about another person would affect the size of the pattern projection effect. It may be that part of making sense of one's own feedback is creating a coherent story linking together the parts of the feedback. It is possible that people are less likely to engage in this more detailed explanatory thought when also exposed to someone in whom the types relate in an opposing way. Although speculative, this may explain the weaker effect in Study 5 than in Study 4 despite no evidence of pattern projection from others in the three previous studies.

General Discussion

People's knowledge of themselves can have a profound influence on their beliefs about others. Although this observation has often been documented in the psychological literature (Alicke et

al., 2005), the present research goes beyond past demonstrations by showing that people do not merely use information about their standing on individual variables to make inferences about others along a specific trait, but also use the patterning of traits within the self to guide their inferences about the geography of personality in general. Using both correlational and experimental methods, we suggested in our five studies that IPTs are affected by views of one's own personality and that this process is egocentric—driven more by information about the self than by information about another well-known individual.

Although it has been known that the self is used at least in judging similar others (Ames, 2004; Dunning & Cohen, 1992; Dunning & Hayes, 1996), this research demonstrated, by adding patterns to what can be projected, that the self is used to understand others more generally. People do not merely see their own traits in others; they believe that the relationship between traits in the self will be recapitulated in others as well. Study 1 found that the more people believed that two traits were positively related in the world, the more likely the traits were to covary in the self, and that the more they believed two traits were negatively related in the world, the more likely they were to occur in opposition in the self. Studies 2 and 3 found that when given information about a target's standing on one trait, estimates of how the target would stand on a second trait depended on how the two traits related in the self. Although Study 2 did not find evidence of pattern projection onto targets who were low on a given trait, Study 3 more precisely specified the target's standing on each trait and found egocentric pattern projection regardless of whether the target was high or low on a trait.

Studies 4 and 5 suggested that participants' self-perception causally influences their IPTs. In Study 4, participants shifted their IPTs to be consistent with their own (false) personality feedback but not to match a past participant's feedback. In Study 5, confronting participants with personality feedback about themselves and the previous participant, which always presented conflicting information about how the personality types co-occurred, provided a more stringent test for the special contribution of the self to inferences about trait relationships. Participants' theories continued to be influenced more by the (supposed) way personality traits related in the self than by how they related in someone else.

We should note that across our studies, we repeatedly found evidence for pattern projection that standard attributive projection could not have predicted. This pattern of inference is quite distinct from the pattern predicted by attributive projection—in which people infer the presence of two traits independently. Attributive projection would predict that two traits that one possesses would be estimated to occur more frequently but not that they would co-occur more frequently than by chance (Study 1). Nor can attributive prediction account for why participants project themselves onto someone with whom they share one trait and the opposite of themselves onto those with whom they are dissimilar on one trait (Studies 2 and 3). And finally, attributive projection would not have predicted that both participants' personality type and the exact opposite of their own type would be assumed to be more prevalent than types with whom they partially overlapped. In fact, follow-up analyses of Study 4 found evidence of pattern projection (but not attributive projection) for the self and attributive projection (but not pattern projection) from the peer.

Table 4
Percentage of People Believed to Be Classified by Each Personality Type (Study 5)

Self-feedback	Self-opposite	Peer-feedback	Peer-opposite
27.5 _a	23.5 _c	25.7 _b	23.3 _c

Note. Means that do not share a subscript differ at the $p < .05$ level.

Strong Versus Weak Pattern Projection

Even though these results cannot be accounted for by a direct application of attributive projection, one could differentiate a strong pattern projection hypothesis from a weak version. According to the weak version, people do not project trait covariation but instead combine two traits and project those two together. For example, if people are both A and B, they project the combination A–B onto others but do not project not A–not B. According to the strong version of pattern projection, people who are A–B project both A–B and not A–not B onto others. Although all of our analytic techniques tested for the presence of the strong version of pattern projection, it is nonetheless possible that the significant effects were in fact driven by the presence of the weak version only, and so this possibility deserved further inquiry.

In order to distinguish between these two possibilities, we returned to Studies 2 and 3 to conduct additional analyses. In these two studies, people were presented with targets who were either very much or not-at-all trait A, and then participants judged the targets' likely standing on trait B. According to the weak version of the pattern projection hypothesis, the effect of pattern projection should grow stronger as people become more similar to the target (e.g., very idealistic participants judging a very idealistic target) and should be weaker when they are more dissimilar from the target (e.g., not-at-all-idealistic participants judging a very idealistic target).

As such, we reran all of the regression analyses in these studies but this time included two additional terms to assess whether the size of pattern projection depended on the match between the self and the target: (a) the provided trait and (b) the provided trait by relevant self difference score interaction. Where appropriate, we changed the sign of the interaction term so that positive interaction terms would be evidence of only the weak pattern projection hypothesis. In Study 2, we found no evidence that participants pattern projected A–B differently from not A–not B ($M = .027$, $SD = .166$; $t < 1$). In Study 3, we unexpectedly found that the interaction term depended on both the trait that the target possessed (idealistic or resigned) and the level of the trait (very or not at all), $F(1, 58) = 7.91$, $p = .01$. This significant analysis of variance reflected that for three of the four targets, participants showed no difference in how much they projected A–B and not A–not B ($ts < 1.19$, $ps > .25$) but that there was evidence for only the weak pattern projection hypothesis when judging the not-at-all-resigned target ($M = .142$, $SD = .137$), $t(14) = 4.01$, $p = .001$. Thus, across all targets in Study 2 and for three of the four targets in Study 3, there was no evidence that pattern projection was limited by the restrictions of the weak version.⁶

A Normative Analysis of Pattern Projection

One natural question is whether pattern projection is a normatively justifiable phenomenon. Some have argued that projection could be a rational process of induction, whereby the self is used as an admittedly small but informative sample of one in forming estimates of the prevalence of different personal characteristics (Dawes, 1990; Dawes & Mulford, 1996; Hoch, 1987). Although some projection occurs because information about the self is the only type of information available (Gilovich, Savitsky, & Medvec, 1998), we found that people neglect information about others even

when it is known—and a normative analysis of pattern projection would presume that the influence of information about other people should move judgments as much as does self-information. The attributive projection literature has similarly found that projection from the self is greater than that from another person (Alicke & Largo, 1995; Clement & Krueger, 2000; Krueger & Clement, 1994; Krueger & Stanke, 2001). Even when we made information about another person salient at the time of judgment (Studies 1 and 3–5), egocentric pattern projection remained. Furthermore, egocentrism remained even when there was more basis to question the validity of manipulated feedback about the self than about another (Studies 4 and 5). Accordingly, it cannot be stated that pattern projection is merely a rational process of induction: Information about the self is overweighted relative to information about others.

Why Egocentric?

Why are IPTs egocentric in origin? One explanation is that the self is always especially salient (Langer, Taylor, Fiske, & Chanowitz, 1976), which may explain its greater likelihood of being sampled in forming IPTs. But this may not play a large role given that participants who rated themselves and a roommate before stating their IPTs were just as egocentric as those who stated their theories beforehand. In other words, increasing the salience of another exemplar (the roommate) did not reduce the tendency to rely disproportionately on the self.

A second possibility is that people simply have less information about others than they have about the self (Moore & Cain, 2007). Although this explains why the self may have a detectable influence on IPTs, it does not explain why it has such a greater influence than does another well-individuated other (Studies 1 and 3). Still, due to people's unique perspective, they know (or at least believe they know) more about themselves than they do about just about anyone else. However, this does not explain why feedback that people get in the laboratory predicts their subsequently stated IPTs better than does feedback they get about someone else (Studies 4 and 5). In fact, it is perhaps surprising that we observed evidence of egocentrism at all, given that it should have been much harder to manipulate participants' views of themselves than their views of a person about whom they had no other information.

We believe that the most plausible explanation is that we spend more time trying to make sense of ourselves than we do of other people. This could bring about egocentric IPTs along two separate routes. First, links in memory that involve the self tend to be stronger due to being coactivated during introspection or self-activation (J. R. Anderson, 1980; Greenwald & Pratkanis, 1984; Perkins & Forehand, 2006). But this process can account for only half of the theory formation process: that traits that people possess are assumed to co-occur in others as well, and not the part that

⁶ It should be noted that these analyses are especially conservative, given that it is known that standard attributive projection occurs more to similar than to dissimilar others (Robbins & Krueger, 2005; Schul & Vinokur, 2000). As such, if both attributive projection and strong pattern projection were operating, we should expect to see more of what looks like pattern projection onto similar than onto dissimilar others (even though this would simply be due to the combined effects of both attributive and strong pattern projection).

traits that we do not possess are assumed to co-occur with others we do not possess. Also, these linkages would take some time to develop, which makes this explanation suspect in explaining the results from Studies 4 and 5.

We therefore believe that egocentric IPTs may be most likely to occur from constant reflection that strives to create a coherent impression of the self. Thus, creative extroverts may come to decide that exposure to others gives them new ideas and experiences that fuels their creativity, whereas creative introverts may come to believe that time away from others allows them time for solitary reflection that aids in their creative pursuits. Note that both of these causal relationships may be true; they just may not be true for everyone.

This suggests that people may not hold in their heads long lists of intertrait correlations, but they may hold well-elaborated causal theories that are egocentric in nature. For example, participants for whom a nonself exemplar had been made accessible did not show any reduction in egocentric pattern projection (Study 1), suggesting that such theories were likely not formed in the moment on the basis of accessible exemplars. At the same time, we also observed evidence that this theory formation does not need a long period of time to develop but can happen immediately. Participants in Studies 4 and 5 may have tried to make sense of their two personality types in the moment by coming to different conclusions about how their cross-situational consistency or variability may be necessarily related to their detail-oriented or broader focus. To the extent that participants cared less about forming a single, coherent impression of the other participant, they may not have spent the time linking the two types together. We therefore believe that egocentric pattern projection operates through multiple mechanisms, and future research will be necessary to determine in what circumstances, for what kinds of people, and for what types of trait pairs are different processes at play.

Related Work

On the surface, our data seem inconsistent with recent research on transference that has demonstrated that people use information about close, significant others in their lives in forming impressions of other people (Andersen & Chen, 2002; Chen & Andersen, 1999). We found little evidence that participants based their inferences about the patterning of traits on other people that they could bring to mind, such as a roommate. Research on transference, however, paints a different picture. In a typical transference paradigm, information about significant others in one's life (e.g., one's parent, one's best friend) is gathered in the first experimental session. Several weeks later, participants are presented with information about a new person who has an uncanny resemblance to one of their significant others. The net effect of this presentation is that participants falsely remember information about this new target that was never actually presented but is true of their significant other after whom the novel target was constructed (Andersen, Glassman, Chen, & Cole, 1995). Such effects are assumed to stem from the chronic activation of significant others (Andersen et al., 1995). As such, when a target shares overlapping features with a significant other, an entire range of features of this significant representation—evaluations, traits, affective responses, and even motivations—is transferred to this applicable target.

One might contend that we observed exclusively egocentric evidence of pattern projection because the "others" used in our studies were not significant others. While this might be true, there are a number of crucial ways in which transference and pattern projection phenomena differ, suggesting that any potential influence of significant others on pattern projection might happen for a transference-unrelated reason. First, transference effects do not directly require the other person to be significant, but instead to have the chronic accessibility that such significance status implies. It is this chronic accessibility that leads significant other representations to be confused with similar targets, more so than for less chronically accessible representations such as stereotypes or famous people (e.g., Chen et al., 1999). But increasing the accessibility of other representations (in Studies 1, 4, and 5) prior to judgment did not eliminate (or in Study 1, reduce) the egocentrism effect. Second, transference examines effects of representational confusion, whereas pattern projection examines influences on broader theories or prototype representations. Although in Studies 2 and 3, where participants rated novel targets, we might have found evidence of transference phenomena had we idiographically assessed significant others who were similar to the targets of judgment, it is unclear what predictions transference would make for Studies 1, 4, or 5, which focus on theories about the general population. Third, and related to pattern projections' predictions being theory-centric instead of target-centric, transference would not predict that people would project both an observed covariance (A and B) and the opposite of this covariance (not A and not B).

If egocentric trait theories are a byproduct of people striving for a coherent impression of the self, it need not be the case that there is no role for specific others in forming IPTs. In fact, significant others would be a plausible source for such nonegocentric theories, though we expect that any specific significant other would have a smaller influence than would the self. For example, people might try to create a coherent sense of their partner in how the partner behaves in the context of the relationship but might spend less time trying to integrate this identity with what the partner is like at work. In considering the self, each of one's identities is, by definition, self-relevant.

Egocentric IPTs also share some overlap with research exploring the way information about the self seems to guide beliefs about what traits desirable others will possess (Lewicki, 1984). In judging a target about whom participants held a generally positive impression, participants were faster to say that the person had traits that the participants themselves possessed and slower to say person did not have these traits. This effect was reversed when judging targets of whom participants had a negative evaluation. It is as though participants formed a link between traits they possessed and their overall positive view of themselves, which led these traits to be projected onto positive others and withheld from negative others.

However, this research differs with pattern projection in two key ways. First, the pattern that is projected in Lewicki's (1984) research is that between a valence (positivity) and a trait, not between two traits. Second, Lewicki's effects appeared to be much more motivated and therefore affected in ways that the pattern projection hypothesis does not predict. After giving participants negative feedback, Lewicki (Study 3) found that participants' self-serving definitions of trait desirability were actually magni-

fied. The pattern projection account merely views trait covariations in the self as a source of information, not a source of self-esteem.

Demonstrating the Egocentric Nature of Social Inference

Finally, the present research offers strong evidence in favor of an egocentric account of person perception and against a protocentric account. Karniol (2003) argued that the self views itself as distinctive and thus logically would not serve as a default value for making predictions about others. Karniol, therefore, sees the use of the self in judging others as a logical contradiction, instead arguing that people have general prototypical representations of others. Instead of occupying a special representational position, the self, like others, is tagged as distinct only when it differs from this prototypical representation.

Karniol's (2003) self-as-distinct model, however, has trouble accounting for much of the present data. First, Study 1 demonstrated that people's prototypical representations (operationalized as their IPTs) aligned with their judgments of self but not their judgments of their roommates. The self-as-distinct model would be able to account for this only if it assumed that there is much more information tagged as distinct about others than about the self. Second, Studies 4 and 5 offer even stronger evidence against a protocentrism account, demonstrating that manipulating information about the self, but not information about others, alters people's prototypical representations. Even if the self-as-distinct model allows prototypical representations to change with new information, only an egocentric account can explain why this happens for new information about the self but not new information about others.

Conclusion

As people strive to understand a new acquaintance or make inferences about someone whom they see in limited contexts, they often try to draw conclusions about a person's personality without the benefit of direct data. People do not simply rely on cultural stereotypes in drawing such conclusions but instead disproportionately rely on intertrait patternings within the self. Social projection is an old idea in social psychology, but all research on this topic has had a quite restricted view of what can be projected. We hope that this expanded sense of what can be projected will both aid in the understanding of the scope of egocentric processes and help to explain individual differences in social judgment.

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