Dynamics of Differentiation: Similarity as the Precursor and Product of Stereotype Formation

Mariëtte Berndsen and Russell Spears
University of Amsterdam

Craig McGarty
The Australian National University

Joop van der Pligt
University of Amsterdam

The degree of data-based and expected coherence within groups was predicted to enhance intergroup differentiation in the illusory correlation paradigm. Results of Study 1 indicated that data-based coherence was a prerequisite for illusory correlation, and this effect was further enhanced by expected coherence. Reinterpretations of the behaviors also augmented illusory correlation, especially when instructions provided greater scope for this, but only under conditions of data-based coherence. The finding that group coherence enhances illusory correlation contradicts recent findings of A. R. McConnell, S. J. Sherman, and D. L. Hamilton (1997). This anomaly was resolved by showing that the relation between group coherence and illusory correlation is curvilinear (Study 2). Illusory correlation increased with coherence but diminished when group coherence was sufficiently high to undermine meaningful evaluative differentiation between groups. Results showed that intragroup similarity is both a precursor and a product of differentiation and illusory correlation.

In two studies we use the illusory correlation paradigm to examine the role of intragroup similarity and group coherence in the formation and subsequent accentuation of stereotypic differences between groups. The illusory correlation paradigm developed by Hamilton and Gifford (1976) has become perhaps the leading framework within which to study the formation of stereotypic beliefs. Its importance is due in no small part to the apparent generation of stereotypic differences in the absence of real group differences. Hence, the term illusory correlation refers to a tendency to perceive a covariation between two classes of stimuli which are uncorrelated or less strongly correlated than perceived. More specifically, Hamilton and Gifford demonstrated that the combination of infrequent group membership and infrequent behavior resulted in the perception of an erroneous correlation between group and behavior. Hamilton and Gifford argued that this illusory correlation effect occurs because statistically infrequent combinations are particularly distinctive and thus receive more attention, are efficiently encoded, and are more accessible in memory than are nondistinctive cooccurrences. This, then, results in an overestimation of the number of infrequent behaviors performed by members of the minority group.

There is now considerable support for the distinctiveness-based explanation of illusory correlation (Hamilton, Dugan, & Troller, 1985; McConnell, Sherman, & Hamilton, 1994a; Mullen & Johnson, 1990). However, the literature has also provided support for a range of other explanations that are based on memory models (Smith, 1991), information loss (Fiedler, 1991; Fiedler, Russer, & Gramm, 1993), and categorical differentiation (Haslam, McGarty, & Brown, 1996; McGarty, Haslam, Turner, & Oakes, 1993). Currently, it seems unlikely that any one of these models can explain all aspects of the phenomenon found in the research literature, and it seems more likely that they all contribute to the explanation of at least some aspects of this effect. The present research further develops the explanation of McGarty et al. (1993), which is based on self-categorization theory (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987), which in turn has its roots in earlier research on categorization and accentuation processes (Tajfel & Wilkes, 1963; see also Eiser & Stroebe, 1972). Both self-categorization and accentuation theories propose that categories are formed on the basis of the perception of similarities among and differences between stimuli. Categorization occurs to the extent that the differences between categories are larger than the differences within the categories, reflecting comparative fit (Oakes, Turner, & Haslam, 1991). Moreover, the categorization process further highlights and accentuates these perceived differences and similarities (Tajfel & Wilkes, 1963; see also Krueger, 1992).

Whereas the original analysis of illusory correlation has shown that the accentuation of categorical differences is not necessary to explain the genesis of stereotypic differences between groups, McGarty et al. (1993) proposed that the illusory correlation effect could nevertheless be explained in terms of
such a categorical differentiation process. They reasoned that participants ask themselves how the groups differ on the underlying evaluative dimension: "Which of the two groups is better?" This approach assumes that in order to accentuate differences between Groups A and B in the illusory correlation paradigm, participants need to perceive some systematic contrasts or differences between the two groups. McGarty et al. (1993) argued that, in absolute terms, there are real evaluative differences among the stimuli used in the classic task (Hamilton & Gifford, 1976) because there is more evidence for the hypothesis that Group A is "good" and Group B is "bad" (18 + 4 = 22 stimuli) than for the opposite hypothesis (9 + 8 = 17 stimuli; see also Fiedler, 1991). The positivity of Group A over Group B thus provides comparative fit between group membership and behavior and presents a basis for accentuating the differences between the groups. McGarty et al. (1993) found support for their categorization explanation in experiments in which people only received general information about the proportions of groups or of behaviors, and thus were not exposed to distinctive combinations of group and behavior. The mere knowledge that there was a larger number of desirable behaviors and that Group A was larger than Group B (provided in the instructions) was sufficient to produce illusory correlations. In short, the explanation of categorical differentiation proposes that illusory correlation is a product of a sense-making differentiation process that is based on genuine group differences in the stimulus distribution.

McGarty et al. (1993) focused on the effects of the differences between categories or groups on the perception of illusory correlation. In the studies reported on below, we investigated the impact of the category levels by manipulating the differences within the stimulus groups in several ways. We propose specifically that categorization and illusory correlation can be enhanced to the extent that the stimuli within the target groups embody a degree of similarity or coherence.

**Study 1**

Study 1 tested the effects of the degree of intragroup similarity, or group coherence, on the perception of illusory correlation between group membership and desirability of behavior. It was important to distinguish two related aspects of intragroup similarity that can play a role in categorical differentiation and, thus, illusory correlation. First, the stimuli to which perceivers are exposed possess a certain level of similarity that serves as an input or precursor in deciding the coherence of the group and assessing whether indeed meaningful groups exist. Second, similarity is also the outcome or product of a judgmental process. The role of similarity as an input and output is also highlighted in the analysis of Medin, Goldstone, and Gentner (1993; see also Yzerbyt, Rocher, & Schadron, 1996). Medin et al. argued that perceiving similarity is a dynamic process of selecting appropriate features (i.e., similarity as a precursor) and weighting these in judgment (i.e., similarity as a product). These two aspects of similarity are also evident in the work of Tajfel on social categorization and judgmental accentuation (Tajfel, 1969; Tajfel & Wilkes, 1963; see also Eiser & Stroebe, 1972; Krueger & Clement, 1994; McGarty, Haslam, Hutchinson, & Grace, 1995; McGarty & Turner, 1992; Turner et al., 1987; Turner, Oakes, Haslam, & McGarty, 1994). In the present research, we investigated both of these aspects of similarity and, in the following sections, we distinguish between inputs involving the perception of group similarity and coherence (data-based and expectation-based coherence), and output factors relating to the process of accentuating intragroup similarity or coherence (reinterpretation of stimuli). These are now considered in more detail.

**Similarity as Precursor: Data-Based Coherence**

In the present study, we manipulated coherence and distinguished between group coherence contained in the stimuli presented to participants (data-based coherence) and group coherence as an expectation held by the participants (expectation-based coherence).

According to the categorization perspective, decreasing the differences within each stimulus group (while keeping the intragroup differences constant) should increase the degree of categorical differentiation and illusory correlation. One way to operationalize intragroup difference is in terms of the distance or discrepancy between positive and negative behaviors within each group. Extremely polarized behaviors within a group increase the dissimilarity within that group, and this should reduce the association between group and a particular kind of behavior, which should in turn attenuate the illusory correlation effect. In contrast, when group members show slightly negative and slightly positive behaviors, the distance or difference between the types of behavior is very small and the resulting intragroup similarity and coherence should enhance the illusory correlation effect. In the present study, we manipulated data-based coherence by varying the distance between the positive and negative behaviors in each group in this way (large intragroup difference vs. small intragroup-difference conditions).

Our prediction is in line with research by Ford and Stangor (1992), who did not use the illusory correlation paradigm but adopted a similar theoretical perspective. They demonstrated that group stereotypes are based on behaviors for which the within-group differences are small rather than large; stereotyping increased as variability diminished (see also Doosje, Spears, & Koomen, 1995). This finding matches our own prediction. However, a fundamental difference between our experiment and that of Ford and Stangor is that in the present study, stimulus groups do not differ from each other, either in their variability of behaviors or in their means (in all of Ford & Stangor's studies, the groups differed from each other on one or both of these dimensions). The present approach therefore involved an extra step, namely that greater coherence contained in the stimuli will lead to enhanced categorization and stereotyping and also that within the illusory correlation paradigm, this should lead to greater differentiation between groups (groups of equal variability) and thus enhances illusory correlation. This prediction is made possible by the skewed frequency distributions of the illusory correlation paradigm, which, as explained earlier, makes categorical differentiation in terms of comparative fit possible.

**Expectation-Based Coherence**

A second important aspect of similarity as input or precursor is what people expect to see. In the realm of covariation assess-
ment, Alloy and Tabachnik (1984) have shown that expectations as well as actual data are important to the relationships we perceive, and expectations have long been known to influence social perception (Crocker, 1981; Nisbett & Ross, 1980). It seems reasonable to assume that expectations involving differences between the groups (Berndsen, Haslam et al., 1996) also include the expectation that members belonging to a particular group will display similar behaviors, because the very term “group” suggests that individuals who belong to it share behaviors, outlooks, or attitudes, at least to some degree. We argue that participants are likely to expect similar behaviors in each stimulus group and that when this expectation is explicitly strengthened, illusory correlation may be facilitated. Following the categorization approach, we predict that expectations of group coherence will enhance the perception of illusory correlation. This prediction is in contrast with the reasoning of Hamilton and Sherman (1996; see also McConnell, Sherman, & Hamilton, 1997), who argued that expectations of coherence induce on-line information processing, which consequently reduces the illusory correlation effect. Alternatively, expectations of noncoherence should lead to memory-based processing, resulting in illusory correlation effects. Manipulating expected coherence as well as data-based coherence orthogonally should help to shed some light on these opposing predictions and perspectives, and we consider this apparent contradiction more explicitly in Study 2. In Study 1, expected coherence is manipulated by informing participants either that members of each stimulus group share similar behaviors and attitudes, or that the group members are dissimilar in these respects. This manipulation of expected coherence resembles that of McConnell et al. (1997).

We predicted that the manipulation of expected coherence would affect the perception of illusory correlation when participants are presented with moderately polarized behaviors (i.e., small intragroup differences) but not when they are presented with extremely polarized behaviors (large intragroup differences). This is because we expected that perceiving noncoherent (i.e., extremely polarized) behaviors within each group should have greater impact than the induced expectation involving group coherence (at least for an expectation that has never previously been tested or reinforced by data). This proposition is in accordance with the model of Alloy and Tabachnik (1984), who proposed that the perception of covariation is a function of the interaction between the strength of prior expectations and the strength of empirical information (Berndsen, Van der Pligt, Spears, & McGarty, 1996). Thus, we expected that our expectation-based coherence manipulation would affect the perception of illusory correlation in the case of small intragroup differences (data-based coherence) such that expecting coherent stimulus groups leads to stronger illusory correlation effects than expecting noncoherent groups. We did not expect this effect to occur when there were large intragroup differences because the stimulus groups were already noncoherent because of the extremely polarized behaviors.

**Similarity as Product: Reinterpreting the Stimuli**

Thus far we have considered the effects of inputs (data and expectations) that serve as the basis for intragroup similarity and perceived group coherence (similarity as precursor). We now consider in more detail the second aspect of similarity, and specifically how this basis for coherence is further accentuated through judgment (similarity as product). In the illusory correlation paradigm, one important way in which similarity (and differences) can be accentuated is in terms of the judgment and construal of the behaviors attributed to the groups.

The idea that perceived meaning is not fixed but interpreted and construed in context goes back to Asch (1952; see also Griffin & Ross, 1991, for a review of research on construal processes). In the context of the illusory correlation paradigm, previous research we conducted (Berndsen, Van der Pligt, et al., 1996; Berndsen, McGarty, Van der Pligt, & Spears, 1996) has demonstrated that reinterpretative processes can play an important role in the perception of illusory correlation. We showed that in order to distinguish between the groups, participants accentuated the evaluations of the behaviors. For example, participants interpreted the supposedly positive behaviors of Group B as less positive and the negative behaviors of Group A as less negative, which enabled them to differentiate meaningfully between the stimulus groups such that Group B was associated with negative behaviors and Group A with positive behaviors. In other words, evaluative reinterpretations can help to produce or reinforce perceived similarity. Moreover, in our previous work, we demonstrated that these reinterpretations occur during the perception of the stimuli and contribute to the illusory correlation effect.

With respect to the present study, it is important to determine the degree to which intragroup similarity allows perceivers to reinterpret behaviors in line with their expectation and perception of coherence. It seems reasonable to assume that it is easier to change the evaluative meaning of slightly positive and negative behaviors than the meaning of extremely polarized behaviors. For example, behaviors that are a priori evaluated as slightly positive could be interpreted as moderately positive, neutral, or even slightly negative. In contrast, extremely positive and negative behaviors provide less scope for reinterpretation; their meaning is always likely to be positive or negative, irrespective of attempts to reinterpret them. Therefore, we expect the manipulation of behavioral extremity associated with data-based coherence to set a limit on how much people can reinterpret given stimuli.

Another way to limit reinterpretation scope is by means of explicit feedback about the proportion of different categories of behavior because this should set a boundary on how many behaviors can be reinterpreted as possessing a valence other than that intended. Reinterpretation scope was therefore manipulated by informing participants either that two thirds of the behaviors are positive and one third negative (narrow scope for reinterpretation) or by omitting this information (broad scope for reinterpretation). We expected that this manipulation would affect the illusory correlation effect in the condition with small intragroup differences such that limiting the scope for reinterpretations reduces the effect. However, reinterpretations were expected to play a less dominant role in the large intragroup-differences condition because the extremity of behaviors in itself is expected to limit the range for reinterpretation. Thus, one should not be able to limit scope for reinterpretations when there is already little or no scope to reinterpret the data.

The degree of reinterpretation was measured by asking parti-
participants to rate each statement on an evaluative dimension (the rating task; see Berndsen, Van der Pligt, et al., 1996) and comparing the ratings with those of participants in a control condition who did not participate in the illusory correlation experiment (i.e., where each statement is simply rated without being linked to a particular group). An additional feature of this rating procedure is that it allows for the assessment of the reinterpretation (and illusory correlation) over the course of perceiving and rating the stimuli and thus provides insight into how perceived similarity is accentuated and how it develops over time (i.e., through the course of perceiving the stimulus set). We expected that, particularly in the condition with small intragroup differences and a broad scope for reinterpretation, rating the statements during the stimulus-perception phase would lead to an increase in reinterpretations from the first to the second half of the stimulus series as perceivers develop and confirm their ideas about how the groups differ (Berndsen, Van der Pligt, et al., 1996; Berndsen, McGarty, et al., 1996). Rating the statements at the beginning should therefore provide insight into how impressions about the groups gradually develop, as evidenced by an increase in reinterpretations. However, this shift in reinterpretations should not occur when this rating task is completed at the end of the experimental session (in the small intragroup-differences condition with a broad scope for reinterpretation), because participants will have already perceived the statements (as in the traditional illusory correlation task) and should have already formed impressions of the groups and adjusted their perceptions of the statements accordingly. In other words, for these participants, any reinterpretations observed in the first half of the stimulus set should be just as strong as those observed in the second half. In sum, the aim of the first study was to test whether perceptions of group coherence, expectations of coherence, and reinterpretations of behaviors play a role in the formation of illusory correlation. In line with the foregoing analysis, we formulated the following predictions.

1. We predicted more illusory correlation in the condition with small intragroup differences than in that with large intragroup differences.

The following predictions focus on the condition with small intragroup differences, providing the opportunity to investigate the process underlying the formation of illusory correlation.

2. In the condition with small intragroup differences, the illusory correlation effect will be weakened when the groups are expected to be noncoherent (see also the fourth prediction involving the coherence ratings).

3. In the condition with small intragroup differences, a broad reinterpretation scope will produce greater illusory correlation than will a narrow scope (see also the fifth prediction involving reinterpretations).

4. Telling participants that the groups are coherent should enhance the judged coherence in the small intragroup-differences condition.

5. A narrow scope for reinterpretation will reduce the amount of reinterpretation in the small intragroup-differences condition.

6. With small intragroup differences and a broad scope for reinterpretation, the evaluative reinterpretations from the first half of the stimuli to the second half will increase when participants perform the rating task first.

Method

Participants and Design

A total of 311 first-year psychology students of the University of Amsterdam participated in the experiment, which was conducted in a lecture hall. This study formed a 2 (data-based coherence: small vs. large intragroup difference) × 2 (expectation-based coherence: coherent vs. noncoherent groups) × 2 (reinterpretation scope: narrow vs. broad) × 2 (position of the rating task: during perception of stimuli vs. at end) factorial design. Participants were randomly assigned to one of the 16 experimental conditions.

Materials, Independent Variables, and Procedure

Using similar instructions to those of Hamilton and Gifford (1976), we informed participants in a questionnaire about the purpose of the experiment. All participants were told they would be shown behavioral descriptions of members of two groups, labeled A and B, and that because in the real world Group B is smaller than Group A, statements describing members of Group B would occur less frequently. We manipulated the independent variables as follows.

Intragroup differences. In a pilot study, 165 behavioral descriptions had been rated by 20 participants on a 9-point scale ranging from very undesirable (1) to very desirable (9). For the condition with large intragroup differences, 36 extremely polarized items were selected: 24 items were extremely positive (ranging from 7.4 to 8.4) and 12 items were extremely negative (ranging from 1.5 to 2.4). For the condition with small intragroup differences, 36 moderately polarized items were selected: 24 items were slightly positive (ranging from 5.5 to 6.4) and 12 items were slightly negative (ranging from 3.5 to 4.5). In each condition, the overall evaluations of the desirable and undesirable behaviors in each stimulus group were equivalent. All participants were provided with 16 positive and 8 negative behaviors performed by members of Group A, and 8 positive and 4 negative behaviors from Group B members.

Expectation-based coherence. During the introduction of the study, participants were informed that the stimulus groups were coherent by the following passage: "It is known that members of Group A share the opinions and attitudes belonging to Group A." This was repeated for Group B. Noncoherence was manipulated by stating that members of Group A (B) strongly differ within the group in their opinions and attitudes. This information was also printed at the top of each page in the response booklet.

Scope for reinterpretation. The scope for reinterpretation was limited by including the line that two thirds of the behaviors were positive and one third were negative, which was also printed at the top of each page in the response booklet. The scope for reinterpretation was maintained by omitting this line.

Position of rating. After the introduction, participants were presented with the behavioral stimuli. Evaluative rating of the statements then either occurred concurrently with stimulus perception at the start or was delayed until after completion of the dependent measures (when the stimuli were presented once again in order to be rated). Thus, after the introduction, participants either just perceived the statements in which the behaviors were linked to groups, or they perceived and rated the same statements. Ratings were made on 9-point scales ranging from very undesirable (1) to very desirable (9). The scores on the rating task were combined for each participant according to the following formula: rating index = (M A+ - M A-) + (M B+ - M B-). In a control condition (where the statements were rated without being linked to a particular group), the rating index was equal to zero. The observed rating indices in the present study were compared with zero. A positive rating index indicates a more positive evaluation of Group A, with zero indicative of a neutral judgment.
Manipulation Checks and Dependent Variables

Next, all participants were asked to judge the coherence of each group on an 11-point scale ranging from not at all coherent (0) to extremely coherent (10), followed by the frequency-estimation task and the evaluative trait-rating task. For the frequency-estimation task, participants were informed that 24 behaviors were from members of Group A and 12 behaviors were from members of Group B. They were asked to estimate how many of the statements about members of both groups had described desirable and undesirable behaviors. For the evaluative rating task, two positive (pleasant and sympathetic) and two negative (unfriendly and selfish) traits were selected. Participants rated how much each trait described Group A and Group B on 9-point scales ranging from not at all (1) to extremely (9). Finally, participants who just perceived the statements first were asked to complete the rating task.

Results

Overview of Analyses

We formulated six predictions that were tested by analyses of variance (ANOVAs). For all predictions, except for the first prediction involving a main effect of the manipulation of intragroup differences, planned contrasts formed the principal tests. The planned contrasts concerned the conditions with small intragroup differences because our a priori predictions excluded the conditions with large intragroup differences. The specific nature of the predictions justifies the use of planned contrasts rather than omnibus ANOVA tests (Rosenthal & Rosnow, 1991).

Manipulations

Before examining whether the manipulations of coherence and scope for reinterpretation were successful, we tested the effects of the position-of-rating manipulation in a 2 (intragroup differences) x 2 (position of rating) x 2 (scope for reinterpretation) x 2 (expected coherence) ANOVA. Results showed no significant main effects or interactions between this variable and the other three variables on any dependent variable. An order effect of the timing of the rating task should have implied that the two groups of participants differed in their manner of reinterpretation and in their level of illusory correlation. However, the present findings showed that whether the participants rated the statements at the beginning or just simply perceived them did not lead to differences in illusory correlation. To facilitate the presentation of data, we therefore collapsed across the position-of-rating variable in the subsequent analyses.

With respect to the manipulations, the coherence questions for both stimulus groups yielded a Cronbach’s alpha of .92, and one coherence score was computed on a scale ranging from 0 to 20, with higher ratings indicating more coherence. The coherence ratings are shown in Table 1. We analyzed the judged coherence in a 2 (intragroup differences) x 2 (expected coherence) x 2 (scope for reinterpretation) ANOVA. A strongly significant main effect of intragroup differences, $F(1, 303) = 63.32, p < .001$, confirmed that the reported coherence was greater in the small intragroup-differences condition ($M = 10.88$) than in the large intragroup-differences condition ($M = 7.46$). Moreover, a significant main effect of expected coherence, $F(1, 303) = 4.37, p < .05$, demonstrated that expectations of coherent groups produced higher coherence ratings ($M = 9.60$) than did expecting noncoherent groups ($M = 8.68$). These two main effects demonstrate that the manipulations of both data-based and expected coherence were successful.

The scores on the rating task (rating index) are also presented in Table 1; a higher rating index refers to greater reinterpretation. A 2 (intragroup differences) x 2 (scope for reinterpretation) x 2 (expected coherence) ANOVA resulted in a significant main effect of reinterpretation scope, $F(1, 302) = 7.19, p < .01$, revealing that a narrow scope ($M = 0.36$) reduced the level of reinterpretation compared with a broad scope ($M = 0.60$). This main effect can be considered as a check indicating that the reinterpretation scope manipulation was successful.

Table 1

<table>
<thead>
<tr>
<th>Large intragroup differences</th>
<th>Small intragroup differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coherent</td>
</tr>
<tr>
<td><strong>Variable</strong></td>
<td>Narrow</td>
</tr>
<tr>
<td><strong>Rating index</strong></td>
<td>0.17</td>
</tr>
<tr>
<td>Coherence</td>
<td>7.13</td>
</tr>
<tr>
<td><strong>Estimation</strong></td>
<td>0.50</td>
</tr>
<tr>
<td>Positive A (16)</td>
<td>15.84</td>
</tr>
<tr>
<td>Negative B (4)</td>
<td>4.26</td>
</tr>
<tr>
<td><strong>Zphi</strong></td>
<td>0.02</td>
</tr>
<tr>
<td><strong>Evaluative task</strong></td>
<td>0.15***</td>
</tr>
<tr>
<td>Group A</td>
<td>23.74</td>
</tr>
<tr>
<td>Group B</td>
<td>23.28</td>
</tr>
<tr>
<td><strong>Difference</strong></td>
<td>0.46</td>
</tr>
</tbody>
</table>

*Level at which mean is different from zero (based on one-tailed t tests).

**p < .01. ***p < .001.
Illusory Correlation

A phi coefficient was computed from each participant’s 2 × 2 contingency table on the estimation task, which was converted to a Fisher’s Z score after we found that both phi and Z had generally normal distributions (cf. Haslam & McGarty, 1994). For the estimation task, the rating scales for unfriendly and selfish were recorded, and the four items yielded a Cronbach’s alpha of .81 (Group A) and .84 (Group B). For each group, one evaluative index score was computed, ranging from 4 to 36 (with higher ratings indicating a more positive evaluation). To test for the occurrence of illusory correlation, we compared to zero the mean transformed phi scores and the difference between Group A and B for each condition. The results for both measures of illusory correlation are presented in Table 1, with number of presented (or rated) stimuli given in parentheses. It can be seen that illusory correlations occurred on both measures in the conditions with small intragroup differences.

Our first prediction that perceiving small intragroup differences would result in more illusory correlation than large intragroup differences was supported, F(1,302) = 72.57, p < .001 (estimation task); F(1,303) = 66.83, p < .001 (evaluation task).

Our second prediction was that describing the groups as noncoherent in the condition with small intragroup differences would lead to weaker illusory correlation effects than coherent stimulus groups. A 2 (expected coherence) × 2 (intragroup differences) × 2 (scope for reinterpretation) ANOVA resulted in a marginally significant main effect of coherence on the estimation task, F(1,302) = 3.23, p < .08, and on the evaluation task, F(1,303) = 3.29, p < .08. These effects suggest that participants expecting coherent groups tend to perceive more illusory correlations (estimation task: M = 0.10; evaluation task: M = 0.07) than those expecting noncoherent groups (estimation task: M = 0.07; evaluation task: M = 0.24). The interaction between intragroup differences and coherence was not significant on either measure of illusory correlation. However, a planned contrast supported our second prediction by revealing a significant main effect of coherence on the estimation task, F(1,302) = 5.19, p < .05 (see Table 1; coherence Ms = 0.15 and 0.20 vs. noncoherence Ms = 0.09 and 0.16), and for the evaluation task, F(1,303) = 5.48, p < .05; evaluation task, F(1,303) = 5.55, p < .05, showing more illusory correlations with a broad scope than with a narrow scope for reinterpretations (estimation task: broad scope, M = 0.10, vs. narrow scope, M = 0.06; evaluation task: broad scope, M = 3.15, vs. narrow scope, M = 1.93). The interaction between intragroup differences and scope for reinterpretation was marginally significant on the two tasks: estimation task, F(1,302) = 2.76, p < .10; evaluation task, F(1,303) = 3.28, p < .08. A planned comparison testing the third prediction showed support for this prediction by revealing a significant main effect of reinterpretation scope in the condition with small intragroup differences for the estimation task, F(1,302) = 7.87, p < .01 (see Table 1; narrow scope Ms = 0.15 and 0.09 vs. broad scope Ms = 0.20 and 0.16), and for the evaluation task, F(1,303) = 8.50, p < .01 (narrow scope Ms = 4.69 and 2.66 vs. broad scope Ms = 6.45 and 5.37). Moreover, we hypothesized that these effects would not occur in the condition with large intragroup differences. As expected, in that condition, the reinterpretation scope did not affect the perception of illusory correlation for the estimation task, F(1,302) < 1, ns (narrow scope Ms = 0.02 and 0.01 vs. broad scope Ms = 0.02 and 0.02), or for the evaluation task, F(1,303) < 1, ns (narrow scope Ms = 0.46 and 0.05 vs. broad scope Ms = 0.74 and 0.35).

Expected Coherence

Our fourth prediction was that in the condition with small intragroup differences, describing the stimulus groups as coherent would result in significantly higher coherence ratings than describing the groups as noncoherent. A 2 (expected coherence) × 2 (intragroup differences) × 2 (scope for reinterpretation) ANOVA revealed the predicted interaction between coherence and intragroup differences, F(1,303) = 7.82, p < .01. A planned contrast resulted in support for the prediction that, in the condition with small intragroup differences, the judged coherence would be higher when the stimulus groups are expected to be coherent (see Table 1; Ms = 11.37 and 12.50), rather than noncoherent (Ms = 9.47 and 10.18), F(1,303) = 11.68, p < .001. Our hypothesis did not predict that this difference would be significant in the condition with large intragroup differences, and this was confirmed, F(1,303) < 1, ns (coherence Ms = 7.13 and 7.47 vs. noncoherence Ms = 7.43 and 7.79).

Reinterpretations

Our fifth prediction was that providing a narrow scope for reinterpretation in the small intragroup differences condition will produce less reinterpretation than a broad scope. We analyzed the rating index in a 2 (intragroup differences) × 2 (scope for reinterpretation) × 2 (expected coherence) ANOVA. A main effect of intragroup differences occurred, F(1,302) = 55.64, p < .001, showing more reinterpretations in the condition with small intragroup differences (M = 0.82) than with large intragroup differences (M = 0.15). The interaction between scope for reinterpretation and intragroup differences was also significant, F(1,302) = 6.90, p < .01, in line with our fifth prediction. A planned contrast conducted to test the specific prediction that in the small intragroup-differences condition a narrow scope for
reinterpretation would produce less reinterpretation (see Table 1; $M_s = 0.50$ and 0.67) than a broad scope ($M_s = 1.15$ and 0.98) was significant, $F(1,302) = 13.94, p < .001$. Our hypothesis, however, did not anticipate such an effect in the large intragroup differences condition, and this was confirmed, $F(1,302) < 1$, ns (narrow scope $M_s = 0.17$ and 0.14 vs. broad scope $M_s = 0.19$ and 0.13).

As in studies conducted by us previously (Berndsen, Van der Pligt, et al., 1996; Berndsen, McGarty, et al., 1996), we divided the presented sets of statements in half. Both sets consisted of eight A+, four A-, four B+, and two B- items (thus there was no correlation between group and behavior in each half). The means for each set are reported in Table 2.

Our sixth prediction was that for the small intragroup differences condition, rating the statements at the start and having a broad scope for reinterpretation would result in an increase in the reinterpretations from the first half to the second half of the rating task as compared with completing this task at the end of the experiment. A 2 (intragroup differences) $\times$ 2 (scope for reinterpretation) $\times$ 2 (position of rating) $\times$ 2 (difference between the two halves of the rating task as the within-subject variable) multivariate analysis of variance (MANOVA) resulted in a significant main effect of the within-subject variable, $F(1,302) = 13.58, p < .001$, showing more reinterpretations in the second half ($M = 0.32$) than in the first half of the rating task ($M = 0.16$). A significant interaction between the within-subject variable and the position of the rating task was also found, $F(1,302) = 5.72, p < .05$. This interaction showed that the degree of reinterpretations significantly increased from the first half ($M = 0.11$) to the second half of the rating task ($M = 0.36$) when participants did the rating task at the beginning. However, when completing the rating task at the end of the experimental session, the increase in reinterpretations was much reduced ($M_s = 0.22$ vs. $M = 0.27$). The MANOVA also revealed a marginally significant three-way interaction between the within-subject variable, position of rating, and scope for reinterpretation, $F(1,302) = 3.33, p < .07$. In line with Prediction 6, this interaction demonstrates that with a broad scope for reinterpretation, the increase in reinterpretations from the first to the second half of the rating task is larger when the rating task is completed at the start (during perception) rather than at the end of the experiment, whereas this effect is much weaker with a narrow scope for reinterpretations. A planned contrast supported this by showing that in the condition with small intragroup differences and a broad scope for reinterpretations, rating the stimuli at the start results in increased reinterpretations from the first half to the second half of that task (see Table 2; $M_s = 0.26$ vs. 0.71), as compared with completing that task at the end of the experiment ($M_s = 0.61$ vs. 0.54), $F(1,302) = 9.40, p < .01$. However, as expected, in the condition with small intragroup differences and a narrow scope for reinterpretation, the increase in reinterpretations did not significantly differ between the cases where ratings were made at the start ($M_s = 0.21$ vs. 0.43) and at the end of the experiment ($M_s = 0.18$ vs. 0.34), $F(1,302) < 1$, ns. Further analyses also supported our sixth prediction: Having a broad reinterpretation scope in the condition with small intragroup differences revealed that completing the rating task at the end of the experiment produced significantly greater reinterpretation in the first half of that task (see Table 2; $M = 0.61$) than when doing the rating task at the start ($M = 0.26$), $F(1,302) = 8.69, p < .01$. This effect was not significant for the second half of the rating task, $F(1,302) < 1.7$, ns ($M_s = 0.54$ vs. 0.71).

There were no significant differences in the overall rating index between first completing the rating task ($M = 0.97$) and doing that task at the end ($M = 1.15$) in the condition with small intragroup differences and a broad scope for reinterpretation, $F(1,302) < 1$, ns. Finally, it is worth noting that the significant overall rating indices in the small intragroup-differences condition (see top row in Table 2) show that Group A was associated with more positive behaviors and Group B, with more negative behaviors, indicating that the illusory correlation effect also occurs in the rating task.

**Discussion**

The present data provide support for our prediction that reduced intragroup differences should lead to more pronounced illusory correlation effects. These findings replicate those of a previous experiment where intragroup differences were manipulated in the same way (Berndsen, 1997). When members of a group display strongly evaluatively divergent behaviors, the

| Reinterpretations as a Function of Intragroup Differences, Position of Rating, and Reinterpretation Scope (Study 1) |
|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|
| Large intragroup differences | Small intragroup differences |                                                                 |                                                                 |
|                               | Rating last | Rating first | Rating last | Rating first |                                                                 |                                                                 |
| Reinterpretations             | Narrow | Broad | Narrow | Broad | Narrow | Broad | Narrow | Broad | Narrow | Broad |
| Overall index*                 | 0.14   | 0.20   | 0.16   | 0.11   | 0.52**  | 1.15***  | 0.65***  | 0.97***  |
| First half                     | 0.00   | 0.11   | -0.01  | -0.03  | 0.18   | 0.61   | 0.21    | 0.26    |
| Second half                    | 0.14   | 0.09   | 0.17   | 0.14   | 0.34   | 0.54   | 0.43    | 0.71    |

* The rating index is compared with zero, indicating no differences in behavior between the groups, as found in the control condition. A positive index indicates a more positive evaluation of Group A. Level at which mean is different from zero (based on two-tailed t tests).

** $p < .01$. *** $p < .001$. **p < .05. 

DYNAMICS OF DIFFERENTIATION 1457
illusory correlation effect is reduced to nonsignificance. In this case the fit between group membership and behavior is very weak: It is not easy to regard one group as generally positive and the other as generally negative when extreme contradictions to this characterization are evident. In contrast, the tendency to differentiate between the stimulus groups is stronger when the behaviors of the group members are more similar. Perceiving similarity in the behaviors of each group arguably provides a basis for accentuating similarities within groups and thus for allowing differentiation between them. This effect of data-based group coherence on the perception of illusory correlation is consistent with Ford and Stangor’s (1992) finding that behavioral coherence deriving from low variability enhances the development of group stereotypes. However, the fact that the variability and central tendency of the groups were constant within our conditions means that the analysis, in terms of comparative fit, is required to supplement the role of variability per se in explaining greater differentiation and illusory correlation under conditions of greater coherence. The present study also demonstrates that intragroup similarity in the presented stimuli leads to an increase in judgments of coherence and in the degree of reinterpretation. Moreover, it shows that both expected group coherence and reinterpretation scope contribute to the formation of illusory correlation, but only for moderately divergent behaviors. These findings support and extend the categorization approach proposed by McGarty et al. (1993) by showing that differentiation between the groups is facilitated by coherence within the groups.

An alternative explanation for the effect of reinterpretation scope is that in the narrow scope for reinterpretation condition, participants were provided with the base rates of the proportions of desirable to undesirable behaviors. It is possible that knowing such base rates might have created the opportunity to be more accurate or perhaps even to induce an accuracy motivation, resulting in the reduced illusory correlations observed in the narrow scope conditions. This alternative explanation was examined by manipulating scope for reinterpretation and accuracy motivation orthogonally. Participants with an accuracy goal were encouraged to answer the questions accurately and were promised a financial reward in the event of successful performance. Results supported our expectation that providing base-rate information (as in the narrow scope conditions of our study) did not reduce the illusory correlations because it initiated an accuracy motivation, but because it decreased the opportunity to reinterpret the stimuli. This finding is consistent with the categorization explanation, which does not regard the process of differentiation as any more biasing or inaccurate than lack of differentiation.

The finding that there are no differences in the observed illusory correlations whether participants first just perceive or also rate the statements suggests that a reinterpretive process is taking place as participants perceive the stimuli (as they also do in the traditional illusory correlation task). This is also supported by the fact that, independent of expected coherence, reinterpretations in the small intragroup-differences condition where the statements were rated first, reveal an illusory correlation effect (such that Group A was evaluated more positively than Group B as compared with the control condition where their behaviors were equally evaluated). Moreover, the fact that in this condition reinterpretations increased from the first to the second half of the stimuli, shows that illusory correlation is being developed and strengthened over the course of stimulus presentation (see also Berndsen, Van der Pligt, et al., 1996; Berndsen, McGarty, et al., 1996).

The relatively weak effects of expected coherence on the perception of illusory correlation might be attributed to our manipulation, which was not as elaborate as that of McConnell et al. (1997); they manipulated group coherence by providing participants with the following more detailed instruction: "The members of Group A are very similar to each other and do not differ in many ways from each other. The members come from similar backgrounds, and have the same opinions, similar important beliefs, and similar personalities. Across a variety of situations, members of Group A will act in a similar manner’’ (p. 752). Group B was described in the same way, and the description of noncoherence was exactly the opposite. It seems plausible that such a manipulation was more powerful than our manipulation of expectation-based coherence.

However, a more fundamental difference with the study of McConnell et al. (1997) is that we obtained opposite effects of coherence compared with that study. As noted earlier, their manipulation resulted in reduced illusory correlation as a function of expectation-based coherence, and we turn to the apparent anomaly between their approach and our own findings in the next study.

Study 2

In Study 1 we argued and found that the perception of illusory correlation increases as a function of group coherence. However, this is inconsistent with the arguments of Hamilton and Sherman (1996) that group coherence elicits on-line processing that reduces the illusory correlation effect as supported by the findings of McConnell et al. (1997). It is possible, however, that the contradiction between these findings is more apparent than real if one assumes that there is a continuum of coherence and that the relation between coherence and illusory correlation is curvilinear. In our first study we spoke of noncoherence and coherence. However, looking closely at the scores of the judged coherence in Table 1, the lowest mean coherence rating is 7.13 and the highest is 12.50 on a scale ranging from 0 to 20. Thus what we called “coherence” is not far above the midpoint of the scale and, therefore, might be more accurately described as “moderate coherence.”

In terms of the categorization explanation, it is quite possible that when groups become very coherent and homogeneous, attempts to differentiate them are no longer meaningful or necessary (if the two groups are very different from each other) or become too difficult (if the groups are very similar to each other). Indeed, if we were to take the intragroup similarity argument to an extreme such that both groups were characterized by almost exclusively positive behaviors (and few if any negative behaviors) then the groups would be extremely coherent. This is not to say that one cannot reinterpret those positive behaviors as more or less positive. However, such reinterpretations will not necessarily help to systematically differentiate between the groups unless the stimulus distribution hints at a particular direction in which the two groups should be evaluatively contrasted. When there is a pool of negative as well as
positive behaviors, as in the traditional distribution, there is arguably more scope for generating a correspondence between evaluation ("good" vs. "bad") and group. According to McGarty et al. (1993), this occurs by interpreting the stimulus distribution along the diagonals to create a fit between the group and evaluative dimensions. If negative behavior is negligible or absent in both groups, for example, there is not only a much smaller pool of negative behaviors to reinterpret, or to use to generate fit, but it is also difficult to see why or how a perceiver would realistically see the need to reinterpret an overwhelmingly positive group in relatively negative terms. By way of example, it may be easier and more meaningful to evaluatively differentiate between two groups of "good" and "bad" politicians than two such groups of priests, assuming of course that there is more evaluative variation among the former than the latter.

Following this line of argument, a more precise prediction would have been that judgments of moderate coherence lead to perceptions of illusory correlation (and as before, that judgments of noncoherence undermine illusory correlation). It remains possible therefore that judgments of coherence are an important determinant in the formation of illusory correlation, but that this effect may be bounded at upper as well as lower limits of intragroup similarity.

How does this analysis fit with the findings of McConnell et al. (1997)? Unfortunately, although McConnell et al. (1997) manipulated expected coherence, they did not include a measure of participants' judged coherence so it is difficult to assess precisely where on the continuum of coherence participants in their studies perceived the groups to be. This position is further complicated by the fact that, as our first study showed, expectation-based coherence may interact with data-based coherence (or at least that these may have independent contributory effects). Although our first study suggested that data-based coherence may be a primary determinant or a precondition of perceived coherence, it is well known that expectations can have a powerful effect in covariation assessment (Alloy & Tabachnik, 1984; Crocker, 1981; Nisbett & Ross, 1980), and this might be more likely when expectation-based (non)coherence is strong and data-based coherence is moderate and thus open to interpretation. With respect to the issue of data-based coherence in the research of McConnell et al. (1997), the authors noted that the stimuli presented (Experiment 2) were equivalent in the overall evaluations of the desirable and undesirable behaviors ascribed to each stimulus group. Usually, such overall evaluations refer to moderately desirable behaviors (e.g., with a mean of about 7 on a 9-point scale) and to moderately undesirable behaviors (e.g., with a mean of about 3). With respect to expectation-based coherence, as noted before, the manipulation in the McConnell et al. (1997) study was stronger than our own manipulation. The combination of a strong expectation of coherence and moderate data-based coherence might have confirmed this strong expectation resulting in judgments of extremely coherent groups. Similarly, expecting strong noncoherence but seeing moderate coherence in the behaviors might have produced judgments of more moderate group coherence (with the moderate data-based coherence moderating the strong expectations).

If the induced expectations interacted with the data-based coherence in this way, the research of McConnell et al. (1997) shows that judgments of moderate coherence lead to the perception of illusory correlation and that extremely coherent groups reduce the perception of illusory correlation. This analysis could resolve the anomaly between these two studies. Although the idea that moderate coherence can produce illusory correlation is in line with our first study, the idea that extreme coherence can undermine it has not yet been tested directly. The purpose of the next study is therefore to test whether the relation between coherence and illusory correlation is indeed curvilinear, in an attempt to reconcile the results from our first study with those of McConnell et al. (1997). We investigated this by manipulating group coherence at three levels by varying the stimulus distribution.

In each distribution, the differential group sizes were held constant, but we varied the within-group similarity. One distribution was termed the **noncoherent condition** because of the lack of behavioral similarity within each group: The proportion of desirable behaviors was only slightly higher than that of the undesirable behaviors in each group (desirable to undesirable behaviors = 7:6). In the **moderately coherent condition**, the within-group similarity was increased (desirable to undesirable behaviors = 9:4). In the **strongly coherent condition**, the within-group similarity was very large (desirable to undesirable behaviors = 11:2). In line with the foregoing analysis, we predicted illusory correlations in the moderately coherent condition but not in the noncoherent and strongly coherent conditions, reflecting a quadratic relation between coherence and illusory correlation.

**Method**

**Participants and Design**

The participants were 67 students at the University of Amsterdam who were paid 10 guilders (about $6) for their participation in the study. Participants were randomly assigned to one of the three conditions: noncoherence, moderate coherence, or strong coherence.

**Stimulus Materials and Procedure**

The stimulus materials differed from Study 1. Instead of using extremely or slightly polarized items, we selected 39 moderately desirable and undesirable items for the present study (see, e.g., Hamilton & Gifford, 1976). The stimulus groups did not differ in the overall evaluations of either the desirable or undesirable behaviors. Participants were presented with stimuli according to the distribution in Table 3. It can be seen that the group sizes are the same in all conditions and that there is no correlation between group membership and desirability of behavior.

<table>
<thead>
<tr>
<th>Group</th>
<th>Noncoherence</th>
<th>Moderate coherence</th>
<th>Strong coherence</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>14</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>B</td>
<td>7</td>
<td>6</td>
<td>9</td>
</tr>
</tbody>
</table>
the only difference being the ratio of positive to negative behaviors. As in Study 1 after reviewing the statements, all participants were asked to judge the coherence of each group on an 11-point scale ranging from not at all coherent (0) to extremely coherent (10). Next, all participants completed the assignment task in which they again received all of the statements without group membership. They were asked to indicate group membership of the person who performed each of the behaviors. This was followed by the frequency-estimation task. Finally, for the evaluative trait-rating task, they were asked to evaluate Group A and Group B on five traits. Four of them were the same as in Study 1 (pleasant, sympathetic, unfriendly, and selfish). The fifth trait was helpful.

**Results**

**Coherence**

The coherence questions for Group A and Group B produced a Cronbach's alpha of .97, and, as in Study 1, we computed one coherence score ranging from 0 to 20, with higher ratings indicating more coherence. The coherence scores are reported in Table 4. We expected the highest coherence ratings in the extremely coherent condition and the lowest scores in the noncoherent condition. An ANOVA with condition as the between-subjects variable revealed a significant main effect, $F(2, 64) = 24.43, p < .001$. Planned comparisons demonstrated higher coherence ratings in the strongly coherent condition than in the noncoherent condition, $t(64) = 6.98, p < .001$, or the moderately coherent condition, $t(64) = 3.78, p < .001$. Also, the coherence ratings were higher in the moderately coherent condition than in the noncoherent condition, $t(64) = 3.40, p < .01$. In other words, our manipulation of coherence was successful. Moreover, and in contrast to Study 1, it can be seen from Table 4 that the coherence ratings are in accordance with our intentions as reflected in the labels of the conditions; moderate coherence is indeed represented by a medium level of perceived coherence ($M = 9.79$, scale from 0 to 20).

**Illusory Correlation**

As in Study 1, Fisher’s Z scores were computed for the frequency-estimation task and also for the assignment task. After recoding the rating scales for unfriendly and selfish, the five items produced a Cronbach’s alpha of .90 for each of the stimulus groups. For each group, one evaluative index score was calculated, ranging from 5 to 45, and a higher score refers to a more positive evaluation. We also computed the evaluative difference between Groups A and B. The illusory correlation effects are reported in Table 4. As expected, only participants in the moderately coherent condition displayed illusory correlations. We tested whether there was a quadratic trend in the illusory correlation effects across the three conditions in an ANOVA. The results supported our prediction by demonstrating (marginally) significant quadratic effects for the assignment task, $F(1, 61) = 4.35, p < .05$; estimation task, $F(1, 64) = 3.56, p < .06$; and evaluation task, $F(1, 64) = 4.23, p < .05$.

**Discussion**

The results of Study 2 support our (revised) prediction that group coherence and illusory correlation are related by a quadratic function, with illusory correlation being eliminated for very coherent groups as well as for noncoherent groups and being the highest for a moderate level of coherence. When group members perform both many positive and many negative behaviors, it is difficult to perceive them as a group, as is revealed by the low ratings of group coherence in the noncoherent condition. Being unable to develop clear impressions of such groups appears to prevent meaningful differentiation between the groups. This is not only supported by the lack of illusory correlations but also by the large standard deviations in the noncoherence condition as compared with the other conditions. Similarly, one is not able to differentiate between groups when both groups display predominantly one type of behavior. In this case, each group is perceived as a coherent group, as revealed by the high coherence ratings in the strongly coherent condition. However, this group homogeneity in itself presumably undermines the possibility or plausibility of perceiving one of the groups as more negative, resulting in attenuated illusory correlations. It is important to emphasize that the stimulus distribution of the moderate coherence condition matches the distributions in the standard illusory correlation tasks and that this condition displayed the strongest illusory correlations.

Although we have argued that these results are consistent with the categorization explanation of illusory correlation, it is important to reconsider a possible explanation in terms of the on-line processing of information about coherent groups proposed by Hamilton and Sherman (1996) and McConnell et al. (1997). To recap, these authors have argued that when perceivers are confronted with coherent groups, this evokes on-line processing, which is believed to eliminate memory-based illusory correlations derived from paired distinctiveness. This account does not easily or parsimoniously account for the pattern of our data. First, it was clear that a moderate degree of perceived group coherence (with a mean around the scale midpoint) was sufficient to elicit illusory correlation, undermining the claim that illusory correlation is associated with low group coherence or noncoherence.

---

**Table 4**

**Perceived Coherence and Illusory Correlation as a Function of Group Coherence in the Stimulus Distribution (Study 2)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Noncoherence</th>
<th>Moderate coherence</th>
<th>Strong coherence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coherence</td>
<td>5.71</td>
<td>9.79</td>
<td>14.27</td>
</tr>
<tr>
<td>Assignment task</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive A (18)</td>
<td>11.95</td>
<td>17.22</td>
<td>20.45</td>
</tr>
<tr>
<td>Negative B (4)</td>
<td>6.68</td>
<td>5.09</td>
<td>2.14</td>
</tr>
<tr>
<td>Zphi</td>
<td>-0.07 (.25)</td>
<td>0.06 (.15)</td>
<td>-0.02 (.15)</td>
</tr>
<tr>
<td>Estimation task</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive A (18)</td>
<td>13.29</td>
<td>17.25</td>
<td>18.09</td>
</tr>
<tr>
<td>Negative B (4)</td>
<td>5.90</td>
<td>5.00</td>
<td>4.05</td>
</tr>
<tr>
<td>Zphi</td>
<td>-0.04 (.15)</td>
<td>0.05 (.09)**</td>
<td>0.01 (.13)</td>
</tr>
<tr>
<td>Evaluative task</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group A</td>
<td>25.76</td>
<td>30.33</td>
<td>33.64</td>
</tr>
<tr>
<td>Group B</td>
<td>26.86</td>
<td>27.79</td>
<td>33.18</td>
</tr>
<tr>
<td>Difference*</td>
<td>-1.10 (7.64)</td>
<td>2.54 (5.08)**</td>
<td>0.46 (2.67)</td>
</tr>
</tbody>
</table>

* The number of presented stimuli are given in parentheses.  
* Level at which mean is different from zero (based on one-tailed t-tests).  
* Standard deviations are given in parentheses.  
* $p < .05$.  
* $p < .01$.  

---

$p < .05$.  
** $p < .01$.  
* Level at which mean is different from zero.  
* Standard deviations are given in parentheses.
Second, one can argue that one reason for the lack of illusionary correlation in the low coherence condition was the reduced distinctiveness of the negative minority group behaviors (although this cell was still twice as distinctive as the negative Group A cell, just as in all other conditions). However, if the illusionary correlation effect were based primarily on paired distinctiveness, one might expect illusionary correlation to be highest in the high coherence condition, where the negative behaviors in Group B were most distinctive. It is then not clear when noncoherence or distinctiveness should be paramount in determining illusionary correlation or its absence.

For these reasons we believe that the categorization explanation provides a relatively parsimonious account of the current findings that does not rely on a trade-off between coherence and distinctiveness. Rather, degree of coherence, as reflected by relative intragroup homogeneity, can on its own account for the quadratic relation with illusionary correlation along the lines proposed. However, this reasoning does not, of course, rule out the possibility that the mechanism described by Hamilton and Sherman (1996) and by McConnell et al. (1997) can operate or contribute to the effect described here.

General Discussion

The present studies contribute to an understanding of the illusionary correlation phenomenon by showing that within-group similarities play an important role in the formation of illusionary correlation. Our results provide support for the view that illusionary correlation may at least in part arise through an attempt to meaningfully differentiate between two groups. We are not claiming that evidence for this categorization process rules out the operation of other mechanisms, such as the distinctiveness-based account (Hamilton & Gifford, 1976) and other memory-based (Smith, 1991) or information-loss (Fiedler, 1991) accounts. Each of these mechanisms describes different processes that contribute to the occurrence of illusionary correlation. Although some of the findings obtained in the present studies may also be consistent with a (modified) distinctiveness-based explanation of illusionary correlation, other findings are more problematic for this approach and other related explanations. For example, in both studies we showed that reducing group coherence did not enhance illusionary correlation as implied by the disruption of the on-line processing explanation. Moreover, findings from this Study 2 are also difficult to square with the distinctiveness-based account, because the condition with the greatest distinctiveness produced no illusionary correlations.

An issue that we have not addressed in the present studies, but which raises interesting questions for our approach, involves the relation between coherence and the perception of individual targets. In general, illusionary correlation effects disappear when the targets are individuals rather than groups (Sanbonmatsu, Sherman, & Hamilton, 1987). McConnell et al. (1997) reasoned that coherence plays a role in social information processing of both groups and individuals but that perceivers generally expect more coherence for individuals than for groups, which then facilitates on-line judgments and consequently reduces the illusionary correlation effect. The question then arises as to whether the categorization approach can also explain or accommodate such findings. We agree with McConnell et al. (1997) that people expect individuals to behave more consistently than entire groups. One possible reason why illusionary correlation is eliminated for individuals is therefore very similar to our analysis of the McConnell et al. (1997) findings for group targets. We argued earlier that the very strong expectations of coherence may have combined with moderate data-based coherence to result in quite strong judgments of coherence, undermining the need or ability to differentiate between the groups. If the expectation of coherence for individuals is also strong, this may (in combination with moderate data-based coherence) also result in sufficient levels of coherence to abrogate attempts at meaningful differentiation between targets. According to our curvilinear prediction, high levels of judged coherence should lead to reduced illusionary correlation, which is consistent with illusionary correlation findings for individual targets.

A closely related issue concerns the general question of whether illusionary correlation implies memory-based as opposed to on-line information processing, as has often been proposed in the illusionary correlation literature. Perhaps a more direct means of manipulating on-line processing than the use of individual targets is the use of impression instructions instead of memory-set instructions (e.g., McConnell, Sherman, & Hamilton, 1994b; Pryor, 1986). As predicted, both McConnell et al. and Pryor found that illusionary correlation disappeared under impression instructions in line with the on-line processing explanation. Although this account fits well with the distinctiveness-based account, the categorization explanation suggests that categorical differentiation and, therefore, illusionary correlation, may also occur on-line during the encoding of stimuli. This is consistent with some of the findings in Study 1, which concerned the development of illusionary correlation during the rating task and which also provided supportive reinterpretation data. This would suggest that on-line processing and the formation of illusionary correlation are not necessarily always incompatible as has sometimes been assumed (see also Fiedler et al., 1993; Spears & Van Knippenberg, 1997; Van Knippenberg, Van Knippenberg, & Dijkstra, in press).

Given the central role of coherence demonstrated in these studies, an important question involves the relation between coherence and other research on group stereotyping and the perception of social groups in everyday life. The present studies suggest that stereotype formation is based on at least moderately coherent groups. Although this suggestion appears to be at odds with Hamilton and Sherman's (1996) proposal that illusionary correlation is enhanced by reduced coherence, they also speculated that "perceived entitativity . . . can be a contributing antecedent condition for the formation of stereotypes" (p. 349). Entitativity (Campbell, 1958) refers to the extent to which a group is perceived as coherent, according to Gestalt principles such as proximity and similarity of group members. Our studies show that the proximity of behaviors within a group (i.e., small intragroup differences) and similarity of attitudes (expected coherence) can, within limits, increase the perception of illusionary correlation, indicating that each group is perceived as more entitative. According to Brewer, Weber, and Carini (1995), asking participants to make judgments about groups as a whole (which is the task in illusionary correlation experiments) increases the tendency to perceive that group as an entity. Thus, the concept of entitativity is closely related to that of group coherence.
The impact of entitativity or coherence on the formation of stereotypes is not only supported by our studies and those of Ford and Stangor (1992) but is also intuitively appealing when one considers stereotypes about social groups in everyday life. Moreover, much research on the outgroup homogeneity effect suggests that stereotyping of minority groups often goes hand-in-hand with the perception that they are very similar, if not indistinguishable, on stereotypic dimensions (e.g., Park, Judd, & Ryan, 1991; Park & Rothbart, 1982). Such similarity may be the basis but also the outcome of illusory correlations based on categorial differentiation.

This point raises the issue of whether group similarity (coherence) produces the categorization effect (McGarty et al., 1993) or whether similarity is a by-product of categorization (Medin et al., 1993). The present studies suggest that both processes are involved in the formation of illusory correlation and, we would argue, in categorical differentiation. It seems that intra-group similarity is a precursor and also a product of categorization, indicating that both processes are intertwined. This self-reinforcing nature of similarity over time illustrates the dynamics of differentiation in the formation of stereotypes.

This dynamic character of category formation can be seen as an underlying process in both expectation-based and data-based illusory correlations. These two types of illusory correlations are usually treated separately because expectation-based illusory correlations are considered as explanations for maintaining stereotypes about socially meaningful groups (e.g., Hamilton & Rose, 1980), whereas data-based illusory correlations are seen as explanations for the development of stereotypes (e.g., Hamilton & Gifford, 1976; Hamilton & Sherman, 1989). We argue that these two types of illusory correlation are ultimately not so opposed but are consistent and complementary to the extent that both elicit expectations of differences and similarities.

References


Received July 9, 1996
Revision received November 30, 1997
Accepted December 1, 1997