

Short research note

**Further evidence for expectation-based
illusory correlations**

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Abstract

Subjects were presented with 36 opinion statements ostensibly made by residents of two towns (one large, one small) confronted with the building of a new nuclear power station in the vicinity. There were an equal number of pro- and anti-nuclear opinions for both towns (nine for each combination) so that there was no relationship between attitudes and town. The probabilistic belief that small towns would contain a higher proportion of antinuclear residents, was predicted to produce an 'illusory correlation' confirming the belief. This was strongly supported. Findings were discussed in terms of the literatures on illusory correlation, stereotyping and attitudes.

INTRODUCTION

Illusory correlation refers to the perception of an erroneous relation between two variables (Chapman, 1967). In social psychology, evidence of expectation-based illusory correlations is mainly forthcoming from the field of social stereotyping; prior stereotypic beliefs may produce 'illusory correlations' confirming those beliefs (e.g. Fiedler, Hemmeter and Hofmann, 1984; Hamilton and Rose, 1980; McArthur and Friedman, 1980). The present study is an attempt to replicate and broaden these findings.

Previous research in this field has tended to focus on well established social and occupational stereotypes; certain personality traits are typically associated with a corresponding social category (*cf.* Katz and Braly, 1933). In sum, the stereotypes chosen have been fairly powerful, pervasive and culturally ingrained. However, since stereotypes have been defined as probabilistic and differentiating beliefs concerning social groups (Ashmore and Del Boca, 1981), they may denote the relative attribution of any characteristic, not just stable personality traits. The question then arises

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of whether illusory correlations can result from more ephemeral or *ad hoc* social beliefs.

An opportunity to test this hypothesis in an applied setting arose in the course of research concerned with people's attitudes to the building of new nuclear power stations in towns of South West England (Eiser, Spears and van der Pligt, 1985). A questionnaire survey of Exeter University students ($n=294$) revealed the non-obvious belief that residents from smaller towns would be predominantly more antinuclear. Specifically, subjects were asked to estimate the percentage of residents who would be pro-, neutral and anti- having a nuclear power station in their neighbourhood within typical towns of different size in South West England (*cf.* Spears, 1985). Five categories of town size were given in ascending order of population (<1000; 1000–5000; 5000–15,000; 15,000–25,000; >25,000). From the smallest town upwards estimates ranged from 63 per cent to 42 per cent for the anti-nuclear category and from 18 per cent to 28 per cent for the pro-nuclear category. (The associated linear trends were very significant, and there were no significant main effects due to attitude of subject nor any interactions with town size). The objective then, was to present observers with an equal proportion of pro- and anti- residents from towns of differing size and test for an illusory correlation between these dimensions.

A second reason for conducting this experiment concerns the possible confounding of distinctiveness due to infrequency with effects of prior expectations in studies of this kind. Some have sought to avoid this problem by balancing the amount of information consistent and inconsistent with a particular stereotype. However, such studies have typically examined more than one stereotype and/or more than one social category simultaneously (e.g. Fiedler *et al.*, 1984; Hamilton and Rose, 1980; McArthur and Friedman, 1980). If people do focus on 'confirming events' (e.g. Ward and Jenkins, 1965), the presence of redundant information with respect to any given stereotype, may artificially enhance the distinctiveness of 'consistent' associations. A more powerful test should therefore concentrate on a single stereotype dimension—in this case attitudes to nuclear power.

To summarize, in the following experiment, the prediction is that subjects will perceive an illusory correlation, erroneously associating more anti-nuclear positions with a smaller town.

METHOD

Subjects

Subjects ($n=37$) were selected at random from the pool of questionnaire respondents (approximately 3 months later). All subjects received £1 remuneration and were randomly allocated to stimulus sets.

Stimulus materials

A subsample of opinion statements on nuclear power employed in Spears, van der Pligt and Eiser (1985) functioned as stimuli. Specifically, 18 pro- and 18 anti-nuclear statements were selected to represent a wide range of attitudes (1.37 (pro-) to 10.73 (anti-) on an 11-point scale); the range of *S.D.s* obtained from pre-test ratings was 0.63 to 1.14. Two experimental stimulus sets were constructed each consisting of a

series of 36 exposures of opinion statements. The distribution of statements was equivalent for all combinations of town and attitude position: town A, pro: 9, anti: 9; town B, pro: 9, anti: 9.

Extremity and the content of the items was balanced as far as possible across towns. The stimulus sets were also counterbalanced so that items attributed to town A in one set alternated with those attributed to town B in the other.

Procedure

The procedure was identical to that followed in Spears *et al.* (1985). To summarize, subjects were told that the experiment was about people's attitudes to nuclear power and after rating some attitude statements, they read a written introduction to the study. This described the experiment as an investigation of 'how people perceive and retain other people's views on a certain subject' and stated that they would be presented with a series of slides taped on video concerning people's opinions toward the building of a new nuclear power station in their area. Subjects were told that town A was larger than town B but that the samples were of equal size: '. . . In fact town A is larger than town B. However, we drew representative random samples from both towns so that opinions from the two towns occur equally frequently in the slides, even though town A is really larger'.

After watching the video subjects completed the measures.

Dependent measures

Attribution of statements to town

This section asked the subject to attribute each opinion statement to town A or town B. All the opinions were listed without names, and subjects were asked to fill in a letter for each, corresponding to the resident's town.

Percentage estimates of positions

On this measure subject indicated what percentages of pro- and anti-nuclear residents they estimated there were in each town. (The pro- and anti-categories were actually further subdivided into 'moderate' and 'extreme' residents although this division will not concern us here).

RESULTS

Test for illusory correlation effect

Attribution of statements to town

A 2x2 contingency table was computed for each subject representing the number of pro- or anti- statements attributed to the two towns. These data (see Table 1) clearly support the prediction; subjects overestimated the proportion of anti-nuclear statements emanating from town B (0.60 compared to an 'actual' proportion of 0.50) and they also overrepresent the proportion of pro-statements in town A (0.61 compared to 0.50). By corollary, the remaining two cells are relatively underestimated.

Table 1. Attribution of statements to town

Town	Attitude position				Total
	Anti- Proportion	Pro- Proportion	Anti- Proportion	Pro- Proportion	
Town A					
<i>M</i>	7.14	0.40	10.92	0.61	18.06
<i>S.D.</i>	2.68	(0.50)	2.76	(0.50)	
Town B					
<i>M</i>	10.86	0.60	7.08	0.39	17.94
<i>S.D.</i>	2.68	(0.50)	2.76	(0.50)	
Total					
<i>n</i> = 37	18.00	(1.00)	18.00	(1.00)	36.00

Correct proportions in parentheses.

These tendencies were significant. For mean estimates of the anti-nuclear position the discrepancy was very significant, $t(36) = \pm 4.23$, $p < 0.001$, as was the discrepancy for the pro- position, $t(36) = \pm 4.23$, $p < 0.001$. In order to test for an overall illusory correlation effect, a phi coefficient was computed from each subject's 2×2 table and these data were transformed following Winer (1971)¹. Comparing the mean transformed phi scores with zero resulted in a highly significant difference: $M = 0.741$, $t(36) = 4.84$, $p < 0.001$.

Percentage estimates of attitudes positions within towns

Again a 2×2 contingency table was computed for each subject representing the percentage of pro- and anti-nuclear residents attributed to each town. Table 2 presents these mean estimates. These data clearly support predictions. Subjects significantly overestimated the percentage of anti-nuclear residents in town B and the percentage of pro- residents in town A (60.89 per cent and 55.81 per cent respectively compared to the 'actual' value of 50 per cent). For estimates of town A, the discrepancy was very significant, $t(36) = \pm 3.24$, $p < 0.005$, as was the equivalent discrepancy for estimates of town B, $t(36) = 6.32$, $p < 0.001$. The overall mean of transformed phi scores on this measure also resulted in a very significant difference from zero: $M = 0.704$, $t(36) = 6.76$, $p < 0.001$.

Table 2. Percentage estimates

Town	Attitude position				Total
	Anti- Perceived %	Actual %	Pro- Perceived %	Actual %	
Town A					
<i>M</i>	44.19	50.00	55.81	50.00	100.00
<i>S.D.</i>	10.90		10.90		
Town B					
<i>M</i>	60.89	50.00	39.11	50.00	100.00
<i>S.D.</i>	10.49		10.49		
Total					
<i>n</i> = 37	105.08		94.92		

¹ M (transformed phi) = $2 \arcsine \sqrt{\text{phi}}$.

To summarize, subjects generally displayed illusory correlations associating anti-nuclear residents with the small town, on both dependent measures. Moreover, no effect of subject's attitude or attitude extremity was obtained on either index (see Spears, 1985).

DISCUSSION

Our findings provide further strong evidence for the robustness and generalizability of the expectation-based illusory correlation mechanism. Specifically, the simple probabilistic belief that small towns would have a higher proportion of anti-nuclear residents than larger towns biased perceivers' judgments so that they erroneously reported such a relationship. Moreover, the size of the illusory correlation is relatively large compared to effects produced by distinctiveness and involvement (*cf.* Spears, van der Pligt and Eiser, 1985, 1986). This finding concurs with others suggesting that preconceptual biases are far stronger than sensitivity to 'data-driven' relationships (e.g. Jennings, Amabile and Ross, 1982). Above all, such effects re-emphasize the resistance of prior beliefs to disconfirmation and change.

These findings should also be considered in relation to attitude perception and judgment generally. Much work in recent years has been concerned with the 'false consensus effect', namely the tendency for people to overestimate the prevalence of views similar to their own in the population at large. However, the present research suggests that people may also perceive considerable variation in the distribution of attitudes among different groups (*cf.* Spears *et al.*, 1985, 1986), depending on their prior expectations or beliefs. Like other social stereotypes such beliefs may in turn influence behaviour within the intergroup context.

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RÉSUMÉ

On propose à des sujets 36 opinions émises soi-disant par des habitants de deux villes (une grande, une petite) confrontés à la construction, dans les environs, d'une centrale nucléaire. Il y a un nombre égal d'opinions "pour" et d'opinions "contre" dans chaque ville (neuf pour chaque facteur croisé) de sorte qu'il n'apparaisse pas de rapports entre les attitudes et la taille des villes. La conviction probable selon laquelle les petites villes contiendraient un taux plus élevé d'antinucléaires est présentée de telle manière qu'elle produise une "corrélation illusoire" confirmant la conviction. Les prédictions se sont avérées largement confirmées. Les résultats sont discutés dans le cadre de travaux effectués sur la corrélation illusoire, sur les stéréotypes et sur les attitudes.

ZUSAMMENFASSUNG

Den Vpn wurden 36 Meinungen vorgelegt, die angeblich von Einwohnern zweier Städte geäußert wurden (eine kleine und eine große Stadt), die mit dem Bau eines neuen Kernkraftwerks in der Nähe konfrontiert wurden. Es kam die gleiche Anzahl von Meinungen für und gegen die Kernkraft in beiden Städten vor (9 für jede Kombination), so daß es keine Beziehung zwischen Einstellungen und Stadt gab. Es wurde vorhergesagt, daß die probabilistische Meinung, in kleineren Städten gibt es einen höheren Prozentsatz an Einwohnern mit einer Anti-Einstellung zur Kernkraft, eine "illusorische Korrelation" erzeugt, welche diese Meinung bekräftigt. Diese Vorhersage wurde deutlich bestätigt. Die Ergebnisse werden in Beziehung zur Literatur über illusorische Korrelation, Stereotypisierung und Einstellungen diskutiert.

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