

## Illusory correlation and associative strength of words

RICHARD S. LANG, MICHAEL L. RAULIN, AND LOREN J. CHAPMAN  
*University of Wisconsin*

“Illusory correlation” is the report by observers of a correlation between two classes of events which, in reality, are correlated to a lesser extent or in the direction opposite to that reported (Chapman, 1967). Very strong illusory correlations have been reported in observations of pairs of words (Chapman, 1967) and of psychodiagnostic test protocols paired with fabricated statements of the symptoms of the supposed test-taker (Chapman & Chapman, 1967, 1969; Golding & Rorer, 1972; Starr & Katkin, 1969). In all but the last of these studies the illusory correlation was between stimuli that have strong verbal associative connection.

In contrast, Hartsough (1975) found a reverse relationship between strength of association and degree of illusory correlation. His pairs of stimuli were words and the colours in which the words were printed. He found stronger illusory correlation between colours and their mediated associates than with their primary associates. Mediated association is a weaker connection than primary association. Hence, his findings seem paradoxical.

Hartsough's (1975) experimental stimuli were eight words which appeared once in each of five colours: red, blue, green, yellow, and orange. Four words were each a primary associate, and four were each a mediated associate to one of the four colours. The mediated associates were high strength associates to the primary associates. The associative hierarchies were RED-BLOOD-HURT, BLUE-SKY-CLOUD, GREEN-GRASS-MOW, and YELLOW-BUTTER-BREAD. BLOOD was the primary associate and HURT the mediated associate to RED, etc. Orange was a control colour to which none of the stimulus words was an associate. The eight words in each of five colours yielded 40 stimuli. After viewing the 40 stimuli projected on a screen, subjects were asked to list what colour, if any, each word appeared in most often. Although no word appeared in any one colour more often than in any other colour, subjects reported that the words appeared more often in the colours to which the words were associates, reporting this more for mediated associates than for primary associates,  $t(41) = 2.10, p < .05$  (our computation).

The present study investigated a possible explanation for Hartsough's

Part of this study was work done as a senior honours thesis by the first author, under the guidance of the other two authors. We are indebted to Dr Ross Hartsough of the University of Manitoba for generously providing us with his raw data.

findings. We speculated that the presence of primary associates in the same list as the mediated associates might have strengthened the association between the colours and their mediated associates. We tested two groups of college students, each under one of two conditions. Condition I was designed as a "replication" of Hartsough's, in that the same words were presented in the same colours. In Condition II, the primary associates were replaced with words which had no associative connection with the colours. The hypothesis was that Hartsough's findings would be confirmed in Condition I, but that illusory correlation to mediated associates would be reduced in Condition II.

#### METHOD

The subjects were 155 volunteers from an Introductory Psychology course, each assigned to one of two conditions. Potential subjects were asked to exclude themselves from the experiment if they were colour blind.

The words were printed in 2 in. stenciled letters on 4 in.  $\times$  15 in. sheets of illustration board in each of Hartsough's five colours. The four non-associates in Condition II were SHORT, JOY, TABLE, and HAND. Subjects were tested in groups of 2 to 12 subjects. To control for primacy and recency effects, half of each group was tested under one of two balanced orders of presentation. The subjects were tested using Hartsough's instruction. The subjects viewed all the cards, each for five seconds, and then were asked to write the colour, if any, that each word appeared in most often. Afterwards, subjects were given a brief colour recognition test, and 15 subjects who made an error were dropped.

#### RESULTS AND DISCUSSION

Each subject was scored for the number of words reported in colours for which they were primary associates or mediated associates. Scores could range from 0 to 4 for both kinds of words, and the expected mean value for each would be .80 if the colour responses were completely random.

In Condition I, the mean score was 1.37 ( $SD = 1.31$ ), which differed from the expected value of .80,  $t(64) = 3.55$ ,  $p < .001$ . The mean score for mediated associates was 1.20 ( $SD = .99$ ), which also differed from the expected value of .80,  $t(64) = 3.27$ ,  $p < .002$ . Both scores demonstrated illusory correlation. However, the difference between them was not significant,  $t(64) = .89$ , and the two scores correlated only .14. The difference score of mediated associates minus primary associates exceeded that of Hartsough,  $t(105) = 2.03$ ,  $p < .05$ . In Condition II, the mean score for mediated associates was 1.29 ( $SD = 1.31$ ), which differed from .80,  $t(74) = 3.36$ ,  $p < .002$ , but not from the mediated associates score of Condition I,  $t(138) = .55$ .

Our results, like Hartsough's, demonstrate clear illusory correlation between a word and the colour to which it is an associate. However, the

present results, unlike Hartsough's, show no greater illusory correlation for mediated associates than for primary associates, but rather a small non-significant trend in the opposite direction. Secondly, the results provide no support for our hypothesis that the strength of illusory correlation for the mediated associates is affected by the presence of primary associates in the same list.

The difference between our findings in Condition I and Hartsough's may have resulted from differences in students who attend the two universities, or conceivably from the slight differences of procedure. (In our study, words were on cards instead of on a screen, two orders of stimuli were used instead of one, subjects were seen in groups of 2 to 12 instead of 6, and colour blind subjects were asked not to participate.)

One must conclude that the effect reported by Hartsough (1975) of increased illusory correlation with decreasing associative strength is not robust and that the factor(s) responsible for the difference in findings between Hartsough's study and the present study is unclear.

#### RÉSUMÉ

Huit mots sont présentés une fois chacun dans chacune de cinq couleurs. Certains mots ont un lien associatif primaire avec une couleur, d'autres ont un lien associatif médiat et d'autres enfin n'ont aucun lien particulier. Quarante de ces mots sont présentés à des étudiants du niveau collégial à qui on demande ensuite de dire en quelle couleur, s'il en est, chacun des mots est le plus souvent apparu. En réalité, chacun des mots apparaît une fois en chacune des couleurs. Les sujets ont été victimes de l'illusion attendue et ont affirmé que les mots apparaissaient plus souvent dans les couleurs avec lesquelles ces mots avaient un lien associatif primaire ou médiat. La corrélation exprimant cette illusion a été trouvée également forte dans le cas des liens associatifs primaires ou médiats et, dans le cas des liens associatifs médiats, cette corrélation ne se trouve pas affectée par la substitution des liens associatifs nuls aux liens associatifs primaires.

#### REFERENCES

- Chapman, L.J. Illusory correlation in observational report. *Journal of Verbal Learning and Verbal Behavior*, 1967, 6, 151-155.
- Chapman, L.J., & Chapman, J.P. Genesis of popular but erroneous psychodiagnostic observations. *Journal of Abnormal Psychology*, 1967, 72, 193-204.
- Chapman, L.J., & Chapman, J.P. Illusory correlation as an obstacle to the use of valid psychodiagnostic signs. *Journal of Abnormal Psychology*, 1969, 74, 271-280.
- Golding, S.R., & Rorer, L.G. Illusory correlation and subjective judgment. *Journal of Abnormal Psychology*, 1972, 80, 249-260.
- Hartsough, W.R. Illusory correlation and mediated association: A finding. *Canadian Journal of Behavioural Science*, 1975, 7, 151-154.
- Starr, B.J., & Katkin, E.S. The clinician as an aberrant actuary: Illusory correlation and the Incomplete Sentences Blank. *Journal of Abnormal Psychology*, 1969, 74, 670-675.

First received 6 July 1977