between letters within an item we would have expected it on the 0-sec test of Trial 1, but it did not appear until Trial 4. Third, acoustic interference depends on the Seq mode. The presentation mode may be a determiner of associative strength and the Seq mode, producing less of it than the Sim mode, is at the low levels of associative strength where acoustic interference is supposed to operate in STM before its transition to long-term memory (Adams, 1967, p. 139). The Sim mode has all the letters and their correct order fully available for rehearsal and mediation throughout the learning period, and these advantages are lacking for the Seq mode. The STM task that most commonly shows acoustic interference in the literature is the Seq mode, immediate recall, and average recall taken over a series of trials where Trial 1 has small weight relative to later trials, and this is consistent with our finding that acoustic interference occurred on the 0-sec test of Trial 4 for the Seq mode.

All groups on Trial 1 showed forgetting over 30 sec, which is consistent with Experiment 1 of Keppel & Underwood (1962) and creates discomfort for the interference theory of forgetting because the source of interference is not evident. Keppel and Underwood surmised that extraexperimental interference affects first items when associative strength is weak enough, although the failure of extra-experimental interference to earn empirical support (Adams, 1967, Chap. 7) makes our two practice items a more likely source of PI. The decay theory of forgetting can painlessly explain Trial 1 forgetting, but the greater forgetting on Trial 4 is more consistent with interference theory and the role it gives PI. A more difficult explanatory task for interference theory is the loss of acoustic interference from 0 to 30 sec.

REFERENCES

ADAMS, J. A. *Human memory.* New York: McGraw-Hill, 1967.

ADAMS, J. A., THORSHEIM, H. I., & McINTYRE, J. S. Item length, acoustic similarity, and natural language mediation. Journal of Experimental Psychology, in press.

CONRAD, R. Acoustic confusions in immediate memory. British Journal of Psychology, 1964, 55, 75-84.

CONRAD, R. Interference or decay over short retention intervals? Journal of Verbal Learning & Verbal Behavior, 1967, 6, 49-54.

GRONINGER, L. D. Natural language mediation and covert rehearsal in short-term memory. Psychonomic Science, 1966, 5, 135-136.

KEPPEL, G., & UNDERWOOD, B. J. Proactive inhibition in short-term retention of single items. Journal of Verbal Learning & Verbal Behavior, 1962, 1, 153-161.

KIESS, H. O. The effects of natural language mediators on short-term memory. Journal of Experimental Psychology, 1968, 77, 7-13.

LINDLEY, R. H. Words and pronunciation as coding aids. Psychonomic Science, 1966, 6, 395-396.

NOTES

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Comments on "Experience with congruity in the perception of incongruity"

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Lasko & Lindauer (1968) concluded from their study that recognition thresholds for perception of a trick card were higher than that for normal cards. It is suggested that their conclusion is inappropriate in the absence of basic control measures.

There have been numerous criticisms of tachistoscopic studies of recognition threshold for unusual, rare, emotional, or incongruous stimuli (see reviews by Eriksen, 1958, 1960, 1962, and by Neisser, 1967, among others). In light of such criticisms, Lasko & Lindauer's (1968) conclusions about their attempt to replicate Bruner & Postman's (1949) study of recognition thresholds for incongruous playing cards are rather surprisingly forthright.

The gist of these criticisms would suggest that the basic phenomenon itself—Bruner & Postman's finding that recognition thresholds for incongruous playing cards were higher than those for congruous, i.e., real, playing cards—may have nothing whatever to do with "recognition threshold." Interpretation of this finding is made no less difficult for its having been replicated 19 years later.

The critical literature raises a number of questions; for instance, as Neisser (1967, p. 118) puts it, "Do variables such as expectancy and experience [in the current case this would be experience with congruous playing cards] affect 'perception,' or do they just create biases? Can these factors determine what people *see* or only what they *say*? [emphases Neisser's]." In the Lasko & Lindauer case, it would seem that the only empirically justified conclusion is that "volunteer Ss" took longer to *verbally report* that they had recognized a trick card—the four of hearts in black—than any of the four normal playing cards. Just as the S may quite deliberately refrain from reporting taboo ("dirty") words lest he be thought "dirty-minded" (cf. Postman, Bronson, & Gropper, 1953; Lacey, Levinger, & Adamson, 1953; Freeman, 1954, 1955), so in the present case might he have refrained from reporting an "impossible" card lest he be thought naive. Presuming one could control for experience with playing cards, it would be interesting to see whether a S's concern for being perceived as "card-wise" is related to his tendency to report an impossible card. In this connection it would be important to know more about Lasko and Lindauer's Ss. If, as is possible, they were college students, they may value skill with playing cards more than do people from noncollege populations.

Lasko and Lindauer might have included a control group told *in advance* which cards would be presented and then given the series of tachistoscopic exposures. These Ss would be instructed to report only the figures that they were certain they perceived on each trial and no others. The threshold would not be defined by the trial on which they could identify the card, since they would already know which card it was, but by the point when they could identify all of the figures on the card. When Haber (1965) used such a procedure for the presentation of rare and common words, the usual differences in

recognition threshold were totally absent. It would be important to know whether the same procedure instituted with congruous and incongruous playing cards would yield the same null effects. If it did, this in and of itself [to paraphrase Neisser's (1967, p. 123) discussion of Haber's study] would not necessarily mean that incongruity does *not* affect the visual processes; it might still do so under ordinary conditions. But a description of the Lasko-Lindauer effects in terms simply of "differential recognition for incongruity" would be called into question.

In any event, it would seem that further research on the various "subception" phenomena would incorporate these and other basic control measures.

REFERENCES

BRUNER, J. S., & POSTMAN, L. On the perception of incongruity: A paradigm. Journal of Personality, 1949, 18, 206-223.

ERIKSEN, C. W. Unconscious processes. In M. R. Jones (Ed.), *Nebraska symposium on motivation*. Lincoln, Nebr.: University of Nebraska Press, 1958. Pp. 169-227.

ERIKSEN, C. W. Discrimination and learning without awareness: A methodological survey and evaluation. Psychological Review, 1960, 67, 279-300.

ERIKSEN, C. W. (Ed.), *Behavior and awareness*. Durham, N.C.: Duke University Press, 1962.

FREEMAN, J. T. Set or perceptual defense? Journal of Experimental Psychology, 1954, 48, 283-288.

FREEMAN, J. T. Set vs perceptual defense: A confirmation. Journal of Abnormal & Social Psychology, 1955, 51, 710-712.

HABER, R. N. Effect of prior knowledge of the stimulus on word-recognition processes. Journal of Experimental Psychology, 1965, 69, 282-286.

LACEY, O. W., LEVINGER, N., & ADAMSON, J. F. Foreknowledge as a factor affecting perceptual defense and alertness. Journal of Experimental Psychology, 1953, 45, 169-174.

LASKO, W. J., & LINDAUER, M. S. Experience with congruity in the perception of incongruity. Psychonomic Science, 1968, 12, 59.

NEISSER, U. *Cognitive psychology*. New York: Appleton-Century-Crofts. 1967.

POSTMAN, L., BRONSON, W. C., & GROPPER, G. L. Is there a mechanism of perceptual defense? Journal of Abnormal & Social Psychology, 1953, 48, 215-224.

Reply to Harris' comments on "Experience with congruity in the perception of incongruity"

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Harris' analysis of the Lasko and Lindauer study of the perception of incongruity, to illustrate the distinction between seeing and saying, and to suggest improvements to control for this apparent confusion, is rejected as neither relevant nor useful.

Harris (1969) affirms the distinction between process and behavior, a separation not only sought in perception with respect to seeing and saying, but in other areas as well (e.g., learning and performance). However, in placing this issue within the context of Lasko & Lindauer's (1968) study of the perception of incongruity, Harris has neither shown that their conclusions are inappropriate nor their design inadequate.

Harris apparently accepts their findings, but argues that the explanation lies not in perception but more likely in the uncontrolled operation of response bias in Ss' verbal reports. However, a verbal response was not the only measure used, for Ss were also required to draw as well as say what they saw. This procedure was adopted as a means of confirming what Ss in interviews during preliminary runs emphatically asserted, namely, that they really saw a black four-of-hearts in red. While it may be possible that both verbal and motor performance were jointly influenced by response bias, the data does not indicate its presence. Since Ss received different amounts of exposure to the materials, differential familiarity with the cards would lead one to expect that response biases would emerge which would also be of unequal strengths; this should then be reflected in divergent threshold values. Yet the thresholds for normal and trick cards did not change as a consequence of these experimental conditions. There are other difficulties in using response bias as an explanatory tool, as it may itself be a result of perceptual processes. One might also question the necessity of making any distinction between perception and response, considering perception globally in the larger cognitive sense: "Perception is a constructive process ... determined by fragments and plausible alternatives [Neisser, 1967, p. 118]." If there is a distinction to be made between the effects of set on perception as distinct from the response, Haber (1966) has concluded that it would be difficult to achieve.

Harris has raised a definitional problem, which if possible or even necessary to make, has not yet been resolved (Neisser, 1967, pp. 118-121). Although Harris found the Lasko and Lindauer study "rather surprisingly forthright" in its presumed negligence of this issue, it should be noted that the original work (Bruner & Postman, 1949) is prominently placed in a text which emphasizes perception (Krech & Crutchfield, 1958, p. 103) as well as in a recent book of readings in perception (Vernon, 1966).

As for Harris' suggestion for improving the Lasko and Lindauer design in order to incorporate his criticisms, it is not clear how telling S what card he will see and then asking him what figures he did see on the card avoids the problem of response bias. It could just as well increase it, since S would then be provided with explicit and specific auditory cues with which to anticipate his response. This control procedure, originally devised by Haber (1965) for use with words of unequal familiarity, may only lead to additional control problems (Neisser, 1967, pp. 122-123).

REFERENCES

BRUNER, J. S., & POSTMAN, L. On the perception of incongruity: A paradigm. Journal of Personality, 1949, 18, 206-223.

HABER, R. N. Effect of prior knowledge of the stimulus on word-recognition processes. Journal of Experimental Psychology, 1965, 69, 282-286.

HABER, R. N. Nature of the effect of set on perception. Psychological Review, 1966, 73, 335-351.

HARRIS, L. Comments on "Experience with congruity in the perception of incongruity." Psychonomic Science, 1969, 15, 78-79.

KRECH, D., & CRUTCHFIELD, R. S. *Elements of psychology*. New York: Knopf, 1958.

LASKO, W. J., JR., & LINDAUER, M. S. Experience with congruity in the perception of incongruity. Psychonomic Science, 1968, 12, 59.

NEISSER, W. *Cognitive psychology*. New York: Appleton-Century-Crofts, 1967.

VERNON, M. D. (Ed.), *Experiments in visual perception*. Baltimore, Md.: Penguin, 1966.