

The Effects of Overt Head Movements on Persuasion: Compatibility and Incompatibility of Responses

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It was hypothesized that overt movement can either augment or inhibit certain cognitive activities depending on whether the movement has been positively associated with or negatively associated with that cognitive activity in the past. Seventy-two subjects who believed that they were testing headphone sets engaged in either vertical, horizontal, or no-instructed head movements while listening to a simulated radio broadcast. Subjects in the vertical head-movement conditions agreed with the editorial content of the radio broadcast more than did those in the horizontal head-movement conditions. This effect was true for both counterattitudinal and proattitudinal editorial content. A surreptitious behavioral measure indicated that vertical movements in the counterattitudinal message condition and horizontal movements in the proattitudinal message condition were more difficult than vertical movement in the proattitudinal message condition or horizontal movement in the counterattitudinal message condition. The processes involved are compared with context learning wherein: (1) the generation of counterarguments is learned in the context of horizontal head movement with poor transfer to vertical head movement; and (2) the generation of agreement responses is learned in the context of vertical head movement with poor transfer to horizontal head movement.

Recent work in attitude change has emphasized the manner in which persons process the information contained in persuasive communications (cf. Himmelfarb & Eagly, 1974). For example, investigators have researched how such independent variables as source credibility (Cook, 1969; Gillig & Greenwald, 1974), distraction (Petty, Wells, & Brock, 1976), forewarning

(Petty & Cacioppo, 1977, 1979), message comprehensibility (Eagly, 1974), number of arguments employed (Calder, Insko, & Yandell, 1974), message repetition (Cacioppo & Petty, 1979b), issue involvement (Petty & Cacioppo, 1979), and anticipated discussion (Cialdini, Herman, Levy, Kozlowski, & Petty, 1976) have affected the profile of cognitive responses elicited by a communication.

In persuasion settings, two important cognitive responses—counterarguments and favorable thoughts—have been identified (e.g., Brock, 1967; Festinger & Maccoby, 1964; Petty, Wells, & Brock, 1976). For example, while listening to an editorial in favor of raising taxes, the recipient might covertly counterargue (e.g., “No way! The government wastes 50% of everything we give them”) or generate favorable cognitive responses (e.g., “This is a good idea, we will be able to give more to the poor”). Attitude change is postulated to be a function of the dominance of one type of response over the other (Petty et al., 1976). To the extent that a manipulation enhances favorable thoughts or reduces counterarguments, increased persuasion should result. On the other hand, interfering with favorable thoughts or enhancing counterarguments should reduce persuasion. Previous tests of the cognitive response view of persuasion have relied on either correlational data (see Miller & Colman, in press, for a review), or on experiments employing manipulations that either inhibit (Petty et al., 1976) or enhance (Petty & Cacioppo, 1979) the production of thoughts. Independent manipulations of counterargumentation or favorable thinking have been difficult to operationalize. The principle problem is that manipulations that inhibit (e.g., distraction) or enhance (e.g., issue involvement) counterarguments also inhibit or enhance the production of favorable responses. Petty et al. (1976) solved this problem by constructing messages in which favorable responses were dominant or counterargument responses were dominant. Thus, when combined with distraction, the dominant cognitive response was more severely disrupted than was the response that was already at a minimum level. In support of the cognitive-response model, distraction enhanced persuasion for the counterarguments message by inhibiting counterarguments but reduced persuasion for the favorable-thoughts message by inhibiting favorable thoughts. A major goal of the present paper is to test a manipulation that was hypothesized to *selectively* affect either the production of favorable thoughts or counterarguments and not thinking in general.

Incompatible Responses

The technique is based on the notion of incompatible responses that has been employed effectively in accounting for the data in other social psychological domains. For example, the aggression literature has recently employed the concept of incompatible cognitive-affective responses to explain the enhancing effects of anger on aggression, and the aggression-inhibiting effects

of mild sexual arousal and nonhostile humor (cf. Baron & Bell, 1974; Berkowitz, 1978; Zillmann & Sapolsky, 1977). Thus, while the subjective experience of anger is thought to be compatible with aggressive responding (Berkowitz, 1978), Baron (1977) posited that, under some conditions, exposure to mild sexual erotica or nonhostile humor would produce responses (e.g., pleasant sexual fantasies, laughter) that were incompatible with aggression. As Baron (1977) states it: "Overt acts of aggression may often be inhibited through the induction of incompatible responses among potential aggressors [p. 268]."

Paralleling the use of incompatible responses in the aggression literature, we hypothesized that the overt response of "head nodding" (vertical movement of the head) would be *incompatible* with the covert, cognitive response of counterarguing but *compatible* with the covert response of favorable or agreement responses. Similarly, "head shaking" (horizontal movement of the head) would be *incompatible* with covert, agreement cognitions but *compatible* with counterargument production.¹

The conceptual framework from which we generated our hypotheses about head movement is analogous to that involved in state-dependent learning (e.g., Ho, Richard, & Chute, 1978).² Specifically, it appears that memorial associations or responses that are established in one psychological context are transferred best to identical or similar contexts. Changing the context or providing a context that generates competing cognitions produces a decrement in performance. As noted earlier, persuasion attempts will generally evoke one of two cognitive responses in a recipient: counterargumentation and/or favorable thoughts. Because we have learned to produce counterargument associations in the context of horizontal head movement, cognitive access to counterarguments will be compatible with horizontal head movement and should be facilitated, whereas access to favorable thoughts will be incompatible with horizontal head movement and should be inhibited. Similarly, because we have learned to produce favorable-thought associations in the context of vertical head movement, such movement should create greater cognitive access to favorable thoughts and lessened cognitive access to counterarguments.

Our predictions were tested by varying the head movements of the recipients of one of two persuasive messages. The subjects believed that they were participants in a headphone testing study in which it was necessary to

¹By "covert responses" we mean the subvocal responses of a recipient to the persuasive communication. Festinger and Maccoby (1964) were among the first researchers to discuss the role of subvocal responses in persuasion. More recently, Cacioppo and Petty (1979a) have found electrophysiological evidence that subvocal, covert responses are generated by recipients of persuasive communications.

²We use context and state learning in this article as a general, conceptual analogy but not as a specific analogy to the multiple models employed in the context and state learning literature.

engage in movement to test for possible sound distortion or discomfort during activity. Embedded in various tasks (e.g., trying on various styles of headphones) was a segment ostensibly recorded from a radio broadcast that included music and an editorial. The editorial constituted the persuasive communication and was either proattitudinal or counterattitudinal to the subject. Our prediction was the same for both messages; more attitude change in the direction of the advocated position of the editorial would occur in the vertical than in the horizontal head movement condition. In addition, consistent with the incompatibility-of-responses notion, we anticipated that the subjects would have greater difficulty engaging in the required head movement in the horizontal-movement-proattitudinal-message and in the vertical-movement-counterattitudinal-message conditions than in the horizontal-movement-counterattitudinal-message and vertical-movement-proattitudinal-message conditions. To test this hypothesis, an unobtrusive measure of the amount of head nodding was obtained.

METHOD

Subjects and Design

Seventy-three students at the University of Alberta participated in partial fulfillment of a course requirement. One subject did not complete the experiment because of a sore left ear that prevented movement while wearing the headphone sets. The remaining subjects were randomly assigned to one of six conditions in a 3 (no head movement, vertical head movement, horizontal head movement) $\times 2$ (protattitudinal, counterattitudinal message) between-subjects factorial design.

Cover Story and Manipulation of Movement

All subjects believed that they were participating in a marketing research study for TechQual (Technical Quality) Incorporated. "This Toronto-based firm, specializing in speakers and headsets, is determined to create the ultimate headphones in terms of sound and comfort." It was explained that "Many headphone sets are either uncomfortable and/or create sound distortions under conditions in which the listener is engaged in movement." The research always began with the subjects testing six different headphone sets. Subjects rated these headphone sets for comfort and sound quality. Subjects were then told that "the final test involves extended listening to one headphone set. Because a headphone set can vary in sound quality depending on whether it is transmitting music or talk, you will hear talk as well as music." One-third of the subjects were randomly assigned to a vertical head movement condition and one-third to a horizontal head-movement condition by stating:

"Consumers want headphone sets that allow movement without experiencing discomfort or sound distortion. We have had people make dancing movements, jumping up and down and so on. But, perhaps the most typical movement is a simple vertical (horizontal) movement of the head. So, this time why don't you just move your head up and down (back and forth) like this [experimenter demonstrates]. When the radio recording begins, start the head movement. Try to maintain a pace of approximately one motion per second. A motion represents one movement up (left) or down (right)."

For the no-movement condition, subjects were told that they were in a control group so that the ratings of quality of sound and comfort made under various specific movement conditions could be compared to their ratings of comfort and sound quality. All subjects were told that they would hear a recording from a radio broadcast. Subjects then put on their headphones; the experimenter cued them to begin the movement and exited. The radio broadcast started within 10 sec. of the experimenter's exit.

Manipulation of the Persuasive Communication

The music and talk that subjects heard over the headphones was a recording of a simulated radio broadcast. It began with 60 sec. of music (the last 60 sec. of Linda Rondstadt's recording of *Blue Bayou*). Then, the disc jockey introduced the station's editorial commentator. The editorial commentator presented a 90-sec. editorial on the topic of tuition increases at the University of Alberta. Subjects either heard a version in which the commentator argued for further tuition *increases* or one that argued for tuition *reductions*. The former version was highly discrepant with subjects' prior opinions and elicited predominantly counterarguments in a pretest using separate samples of subjects, and the latter was congruent with subjects' prior opinions and elicited predominantly favorable thoughts in the pretest. The recording finished with a 3-min., 29-sec. cut of music from the Eagles' *Hotel California* album.

Measures

One measure was surreptitiously taken. As indicated earlier, the experimenter left the subject alone during the head-movement phase of the procedure. However, the experimenter's activity during this phase involved videotaping the subjects' head movements with a video camera hidden behind a black cheesecloth curtain. Focusing the camera at its longest range allowed it to bypass the cloth and pick up an image of the subject that was sufficient for subsequent scoring.

Following the radio broadcast, subjects were given a one-page questionnaire that was designed simply to maintain the cover story. The questionnaire asked the subjects to rate the headphone set on six bipolar

dimensions (e.g., clear tonal quality versus unclear tonal quality). After this, the experimenter explained that "Because your rating of the headphone set could have been influenced by your personal taste in music or your opinions toward the person talking, we would like you to answer a few questions about the content of the music and talking."

A second questionnaire containing either five or six items was then given to subjects. The first two questions asked subjects about the first song that they heard: "To what extent did the first song coincide with your personal taste in music?" and "To what extent did you like the first song?" The third item was the principal measure of interest and asked "What do you feel would be an appropriate dollar amount for under-graduate full-time tuition per year?____" The next two questions asked the subject about the final song that they heard and were worded like the first two questions. The final item was included only for subjects in the horizontal and vertical head-movement conditions and asked "How difficult did you find the head-movement task to be?" Answers ranged from 1 (not at all difficult) to 7 (extremely difficult). This measure was simply a self-report analog of the behavioral measure obtained from scoring the videotapes of head movement.

RESULTS

Check on Assumptions

An important assumption on which our incompatible-responses conceptualization rests is that favorable responses have an association with vertical head movements and counterarguments have an association with horizontal head movements. In order to obtain some independent corroboration, we scored spontaneous head movements in the no-instructed-movement conditions by scoring the videotapes. Independent raters, blind to message content, rated spontaneous head movements by assigning two numbers to each subject: the number of vertical head movements and the number of horizontal head movements. The number of vertical head movements was then divided by the total number of head movements for each subject, yielding mean values of .727 and .470 for the proattitudinal and counterattitudinal messages, respectively [$F(1,22) = 4.46, p < .05$]. These data give reasonable support to the assumed association between head movement and message content; the message that produced primarily favorable thoughts in pretesting tended to produce vertical head movements, whereas the message that produced primarily counterarguments tended to produce horizontal head movements.

Theoretically Unrelated Measures

Although no predictions were made regarding subjects' ratings of the headphone sets or ratings of the music, these ratings were analyzed in a 3 (movement) \times 2 (message content) between-subjects analysis of variance. Only one significant effect emerged from these analyses; an interaction between head movement and message content on the bipolar measure of headphone ratings that asked about comfort versus discomfort, $F(1,66) = 4.62$, $p < .05$. The interaction appears to be almost solely due to lower comfort ratings in the no-movement-counterattitudinal editorial condition than in the other conditions.

Attitude Measure

The attitude measure was analyzed as a 3 (vertical movement, horizontal movement, no movement) \times 2 (proattitudinal message, counterattitudinal message) between-subjects analysis of variance. The results of this analysis produced a significant main effect for message, $F(1,66) = 49.1$, $p < .001$, no main effect for movement, $F(2,66) = 2.67$, $p < .10$, and a significant interaction, $F(2,66) = 44.7$, $p < .001$. Table 1 presents the means and Newman-Keuls analysis for the attitude measure. As indicated in Table 1, the main effect for message is due to the fact that the counterattitudinal message (which argued for increased tuition) produced higher dollar amounts from subjects regarding what they believe tuition should be than did the proattitudinal message. The Newman-Keuls analysis, however, reveals that for both the pro- and counterattitudinal advocacies, the vertical head movements produced greater agreement with the advocated position than the horizontal head-movement conditions. The analyses comparing the experimental conditions with the no-movement control revealed that for the counterattitudinal message, the horizontal movements led to significantly less agreement, whereas the vertical movements led to a marginally significant increase in agreement ($p > .06$). Although subjects in the vertical and horizontal head-movement conditions who listened to the proattitudinal editorial were on opposite sides of the control mean, neither differed significantly from the control.

Further evidence to show a link between overt head movements and the attitude measure was attempted by calculating within-cell correlations between spontaneous head movements and the attitude measure in the no-instructed-head-movements cells. Using a ratio of vertical to total head movements for each subject (as in the "Check on Assumptions" section described earlier), correlations of $-.28$ ($df = 22$, $p > .10$) and $+.42$ ($df = 22$, $p = .05$) were obtained between spontaneous head movements and the

TABLE 1
Attitude Measure and Head-Movement Scores as Functions of Message
Content and Movement Manipulation

Attitude Measure ^a		
Head-Movement Condition	Message Content	
	Counterattitudinal (increase tuition to \$750)	Proattitudinal (decrease tuition to \$400)
No movement	\$582.36 _a	\$412.50 _{bc}
Vertical	\$646.21 _a	\$401.23 _b
Horizontal	\$467.77 _{bc}	\$489.32 _c

Head-Movement Scores ^b		
Head-Movement Condition	Message Content	
	Counterattitudinal	Proattitudinal
Vertical	62.1	98.4
Horizontal	93.3	71.6

^aHigher numbers indicate greater recommended tuition. In the proattitudinal (counterattitudinal) message, lower numbers indicate more agreement (less agreement) with the message. Tuition at the time of the subjects' participation was \$587. Means not sharing a common subscript differ at $p < .05$ by Newman-Keuls analysis.

^bNumbers indicate mean number of head movements in the direction indicated by their respective head-movement condition.

attitude measure in the proattitudinal and counterattitudinal conditions, respectively. Thus, the more one spontaneously emitted vertical relative to horizontal head movements, the more one agreed with the communication. (Recall that the proattitudinal message argued for lower tuition, yielding a prediction of a negative correlation between vertical head movement and the attitude measure.)

Difficulty of Movement Measures

The self-reported difficulty of movement measure and the behavioral measure of movement were each analyzed as separate 2 (vertical movement, horizontal movement) $\times 2$ (proattitudinal message, counterattitudinal message) between-subjects analyses of variance. The self-report measure produced no significant main effects and no significant interaction, F 's (1,44) < 1.7 , p 's $> .25$. The behavioral measure of movement, however, produced a significant interaction, F (1,44) = 5.13, $p < .05$, with no main effects, F 's (1,44) < 1 . Means for the behavioral measure of head movement

are presented in the lower panel of Table 1. The nature of this interaction is consistent with our expectations in that it indicates that subjects had more difficulty keeping pace with our suggested movement rate in the vertical-movement-counterattitudinal-message condition and in the horizontal-movement-proattitudinal-message conditions than in the other two conditions. Reliability between our two head-movement scorers, who were blind to the message-content condition and rated the head movements independently, was $+ .78$.

The correlation between the self-reported measure of difficulty and the behavioral index was $-.32$ ($df = 47$, $p < .05$). In addition, the means on the self-report of movement difficulty show the predicted pattern. It is our belief that the lack of a significant interaction on the self-report measure is due to the fact that it asked about movement difficulty throughout the *entire* radio broadcast of which 75% was music. In fact, the last 3 min. and 29 sec. of the 6-min. broadcast was music, which perhaps masked subjects' recall of the difficulty experienced during the editorial. Whereas we believe that the self-report measure was, therefore, simply insensitive, we felt it would be less desirable to ask subjects to report specifically on movement difficulty during the editorial since that might have induced some form of suspicion.

Suspicion

Our debriefing included an initial question regarding whether or not the subject thought there might be some other purpose to the study beyond the testing of headphone sets. Although originally designed to be a sensitive way to debrief the subjects by gradually revealing the deception, it also serves as a check on any suspicion. No evidence of suspicion was detected; the typical response centered on subjects' beliefs that we were probably interested in the influence of the physical appearance of visual aesthetics of the headphone sets. Thus, even though the subjects did search for a connection between the TechQual firm's interest and the psychology department's interest, subjects seemed satisfied with hypotheses that did not vary across conditions.

No sex effects were evident in any of our results, although the relative paucity of males in the study (17 of the total 73) precludes any definitive conclusion.

DISCUSSION

The current data suggest that people are less resistant to attitudinal influence when engaged in vertical head movement than when engaged in horizontal head movement. This is consistent with our hypothesis that counterargument production, a primary mediator of resistance to change (Brock, 1967; Petty et al., 1976), has been learned in the context of horizontal head movement and

that favorable thought production has been learned in the context of vertical head movement. Thus, the current attitudinal results are consistent with the view that vertical head movements are compatible with and facilitate the production of favorable thoughts but are incompatible with and inhibit the production of counterarguments. On the other hand, horizontal head movements are compatible with and facilitate the production of unfavorable thoughts and are incompatible with and inhibit the production of favorable cognitions.

Unlike previous research that measured cognitive responses with a thought-listing procedure, which in turn is scored for counterarguments and favorable thoughts, we used a behavioral measure of cognitive responding. This surreptitious behavioral measure is informative with regard to the kind of cognitive activities in which our subjects were engaged. First, subjects in the no-head-movement conditions corroborated our view of the kinds of cognitive activity operating at the time. The counterattitudinal editorial produced proportionally more horizontal than vertical head movement; the proattitudinal message produced proportionally more vertical head movement than horizontal head movement. Perhaps more interesting is the fact that this tendency to counterargue the counterattitudinal message interfered with the subjects' ability to adequately follow the instructed vertical head movements. Similarly, subjects' tendencies to generate favorable thoughts to the proattitudinal message interfered with the subjects' ability to follow the instructed horizontal head movements. Thus, our earlier proposition that (1) cognitive activity that has been positively (negatively) associated with overt movement will be augmented (inhibited) by that movement can be extended to include the proposition that (2) overt activity that has been positively (negatively) associated with a cognitive activity will be augmented (inhibited) by that cognitive activity.

We are unable to answer certain questions about the processes mediating the relationship between overt head movement and covert responses. One could argue, for example, that emotive rather than cognitive responses mediated the effects that we obtained. Recent research, for example, shows that such overt activities as the creation of facial contortions affect emotional experiences (e.g., see Laird, 1974; Lanzetta, Cartwright-Smith, & Kleck 1976; Leventhal & Mace, 1970). Emotional experiences can in turn affect attitudes (Rhodewalt & Comer, 1979). There are two reasons for our preferring a cognitive-response rather than an emotive-response model at this time. First, we did not find that head movements produced any differential reactions to the music on an affective-emotive measure of liking. [This is in line with Tourangeau and Ellsworth's (1979) recent research on the link between facial expression and emotion wherein they failed to substantiate earlier claims of a causal effect of manipulated facial expression on emotion.] In addition, we prefer the cognitive-responses framework for its higher parsimony value. Our assumption of greater parsimony with the cognitive rather than the emotive framework stems from the fact that alteration of cognitive responses alone is

sufficient for attitude change, whereas the alteration of emotive states still requires that a label (i.e., cognitive response) be attached to the emotive response (as in Schachter, 1971).

Our analysis is based on an analogy to context learning, which suggests that there might be cultural differences in the phenomenon under consideration. For example, to the extent that people in other cultures learn to generate favorable-agreement responses by horizontal rather than vertical movement, the phenomenon reported here might reverse. Eibl-Eibesfeldt (1972), however, has proposed that a nodding action is universally associated (i.e., without cultural exception) with approval. Darwin (1872) suggested that head shaking and nodding have universal properties that originated from food refusal. Specifically, when a baby is satiated it refuses the breast by turning its head away, which Darwin suggested became ritualized into a "no" by emphasis and repetition. Whatever its origin, however, it is clear that our subjects had trouble generating smooth, rhythmic patterns of head nodding and head shaking to stimuli that were covertly disagreeable and covertly agreeable, respectively.

Although there are many theoretical questions to be answered about the effects of compatibility and incompatibility of overt and covert responses, there are also applications of the effect to such areas as advertising. For example, our results suggest that television advertisements would be most effective if the visual display created repetitive vertical movement of the television viewers' heads (e.g., bouncing ball). Although we do not have empirical data on this issue, our experience leads us to further speculate that head nodding, like yawning, has a contagious effect. This was first noticed when we watched our observers while they scored the videotapes. When the observers were watching someone in the head-nodding condition, the observers were clearly engaging in more vertical head movements than in either the control conditions or horizontal-movement conditions. Consequently, we suspect that a persuader would do well to nod throughout his/her face-to-face encounter with a persuadee.

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