

Subliminal Messages

Between the Devil and the Media

John R. Vokey and J. Don Read
University of Lethbridge

ABSTRACT: *We describe our entanglement in the controversial public issue of subliminal messages in advertising and popular music in order to provide a report of our research unencumbered by the misrepresentations in the various media reports of this work. A distinction is drawn between the alleged presence of these messages in the media concerned and the impact they are purported to have upon the listener or viewer. Our research is concerned primarily with the latter: Is there any evidence to warrant assertions that such messages affect our behavior? Across a wide variety of tasks, we were unable to find any evidence to support such a claim. Secondly, we present evidence to suggest that the apparent presence of backward messages in popular music is a function more of active construction on the part of the perceiver than of the existence of the messages themselves. Finally, we describe our experiences with the public media's handling of these issues.*

In the fall of 1982 we were contacted by a local radio announcer for information about a phenomenon he referred to as "backmasking." However, his question did not concern the well-studied phenomenon of visual persistence (see DiLollo, 1980; Sakitt, 1976); the announcer wanted to know what were the effects on a listener of messages that allegedly had been recorded backward into popular rock music. He informed us that when such recordings are played in the normal, forward fashion, the messages are not consciously perceived; however, played backward, intelligible messages can be heard. His concern was not that listeners would play their records backward and thereby "hear" the messages but rather that the messages would be perceived unconsciously by the listener when the recording was played forward. He informed us that those who advocated this belief also claimed that the messages had an evil content and that, upon hearing them, the youthful listener was led down a path of loose morality and behavioral aberration. Depend-

ing upon the degree of religious belief held by the proponents of these views, the backward messages are, at the least, thought to have been technologically engineered by the rock groups themselves or, at the worst, inserted by Satan.

Why Should We Pay Attention?

The announcer's and subsequently our interest in backmasking arose from the arrival in our city of Pastor Gary Greenwald of the Eagle's Nest Fellowship in California; Greenwald is a well-publicized proponent of these views (Tisdall, 1983). While in our city, Greenwald held a two-day public seminar on backmasking in rock music, which culminated in a mass rally and a large record-smashing spree. At about the same time, the house and senate of the state of Arkansas were debating a bill that would require record distributors to affix stickers to rock music albums warning the consumer of the possible presence of backward messages. It was not long before a bill was passed requiring that the following message be placed on records and tapes sold in the state: "Warning: This record contains backward masking which may be perceptible at a subliminal level when the record is played forward" (Associated Press, 1983). Similarly, the California legislature passed a bill that stated that the distribution of material containing backward messages without public notice is an invasion of privacy, thereby allowing the distributors of such material to be sued (Easley, 1983). Apparently, several elected representatives in at least one other state (Texas) have considered the introduction of similar legislation, and at least one Canadian member of parliament and the Consumers Association of Quebec also have supported government investigation into the issue (Somor, 1984). Clearly, political lobbying by the proponents of these beliefs has been successful.

We should emphasize that Greenwald is not the sole proponent of backmasking in rock music nor necessarily the individual with the most impact. Others include Hot Springs minister Don Hutchings, who

lobbied in favor of the Arkansas legislation, and Michael Mills, president of Research Ministries of Battle Creek, Michigan, who has toured the United States warning parents and their children about backmasking in rock music. In Canada, Allan Lamothe presents lectures on backmasking and rock music to Quebec schools and church groups and has published a book containing a detailed listing of the alleged backmasked content in the rock song *Stairway to Heaven* (Sonmor, 1984). In each case, the thesis is that at least some rock music has been backmasked to contain satanic and drug-related messages and that the content of these subliminal messages influences the listener.

The announcer who contacted us thought that modern experimental psychology could offer some insight regarding the likelihood that people are being influenced by subliminal and backward auditory messages. However, upon searching the literature, we found that apart from the well-known and related work in visual perception generated by the New Look experimentalists of the 1950s (see reviews by Dixon, 1971; Erdelyi, 1974) and the more recent work by Marcel (1983), Merikle (1982), and Henley (1984), there was nothing on the comprehensibility (conscious or otherwise) of messages spoken backward. On the positive side, it seemed to us that, as cognitive psychologists, we had available the research tools to provide some information about the comprehension of backward messages. The results of that work and the media's reporting of it are discussed in subsequent sections. We first discuss a simple distinction that we see as central to both the public's willing acceptance of the backmasking thesis and the media's mishandling of the issue.

The Fallacy That Presence Implies Effectiveness

To argue that subliminal messages in rock music and other media (e.g., advertising) influence our behavior requires that there be messages of the requisite sort. As we began to investigate the issue, however, it be-

came clear that advocates appear to believe that demonstrating the existence of the messages is not merely necessary to the argument but is sufficient as well. In his public seminars, for example, Greenwald presents a collection of reversed recordings of rock music to demonstrate the existence of backward messages. From these demonstrations and the alleged presence and presumed effectiveness of subliminal messages in other media such as advertising, Greenwald concludes that listening to such music is having a detrimental effect on young people.

The connection with subliminal messages in media other than rock music is informative because the bulk of the evidence offered for their effectiveness likewise consists of little more than a listing of purported subliminal messages. Bryan Wilson Key, the major proponent of the claim that advertisers have resorted to "subliminal advertising" to influence the buying public, provides an extensive litany of subliminal messages in various print, film, and television media (Key, 1973, 1976, 1980). Like Greenwald, he presents the "exposed" messages as proof not only that the respective media contain such messages but also that the messages have the intended effect. But even if it is granted that support for the existence of subliminal messages is as good as Greenwald and Key contend—a point we challenge subsequently—it does not follow that the messages must be effective. That is, in the absence of any direct evidence in support of this *belief*, demonstrations of the existence of subliminal messages or even admissions from advertisers and rock musicians that they have used such techniques do not make the alleged effects of these messages any more real.

Regarding the provision of direct evidence for the effectiveness of subliminal messages, both Key and Greenwald are remarkably silent. Greenwald offers the equation of backmasking with studies of subliminal advertising that, by his reckoning, have demonstrated powerful effects, and he asserts the claim that people who listen to rock music have a higher incidence of drug abuse, criminal behavior, and sexual promiscuity than do people who listen to other forms of music. In addition to confounding these behaviors with age, citing the differences as evidence for the effectiveness of backmasking is specious, because Greenwald has advanced backmasking in rock music as a major explanation for the existence of these differences in the first place. Before returning to the topic of backmasking, we will look at the quality of evidence offered for the equation of backmasking with the putative effects of subliminal advertising.

Subliminal Messages in Advertising

According to Key, the dangers of subliminal messages in advertising are so severe that he worries for the

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Requests for reprints should be sent to John R. Vokey, Department of Psychology, University of Lethbridge, Lethbridge, Alberta T1K 3M4 Canada. Further details of the experiments and analyses and an audiocassette tape containing material intended for classroom demonstrations may be obtained by writing to the authors and requesting University of Lethbridge, Department of Psychology, Technical Report No. 85-01. A blank cassette tape should be enclosed if classroom demonstrations are desired.

maintenance of the North American way of life (Key, 1980). The messages that give him the greatest cause for concern are those wherein the advertisers' intent is to have consumers purchase a specific product through their interest in sex. This, of course, comes as no surprise; discussions of advertising technique often have emphasized the central role of sex (e.g., Packard, 1957). What Key offers that is unique, however, is the claim that a variety of subliminal techniques are used to capitalize upon the public's obsession with sex. These include the obvious use of sexual imagery within the verbal and pictorial content of advertisements and, as his main concern, the air-brushed embedding of words and symbols with sexual references into the pictorial content.

Key's reading of the psychological literature, along with the results of his own research at the University of Western Ontario in the early 1970s, led him to conclude that such advertisements do control our behavior. However, the research evidence he provides to support his claims is questionable. For example, to convince the reader of his books that *subliminal* sexual imagery included in a *Playboy* magazine advertisement depicting a naked woman effectively renders the ad more memorable, Key (1973, p. 40) asserts that in research using this ad, about 95% of college-age males who were shown the ad recognized it one month later. Although the exact details of this research are not provided, it is quite possible that college-age males would have remembered the ad equally well without the embedded imagery. Indeed, there are ample data to demonstrate that college students can likely recognize 95% of even relatively extensive sets of pictures shown to them (Shepard, 1967; Standing, 1973; Standing, Conezio, & Haber, 1970).

In a second example, Key (1973, p. 91) suggested that the explanation for an overwhelming preference for a particular brand of rum is the embedded presence of the phrase "u buy" in a pictorial ad depicting four types of rum. The ad has particular relevance for our discussion because, according to Key, the phrase is printed backward. Neither we nor any of the dozens of others to whom we have shown this ad could find the message. In contrast, 80% of the subjects in his studies, Key suggests, unconsciously perceived the backward message, resulting, in Key's view, in a marked preference for the rum so labeled. However, the hypothesis that the rum accompanied by the subliminal message may possibly differ from the other three in significant ways is given short shrift. In fact, the preferred rum is the only one with the words "extra special" clearly announced on the label, is of a much darker color than all of the others, is the only one presented in a high-status brandy-snifter, and comes in a larger bottle. In contrast, in Key's view, only the presence of the subliminal message provides a plausible explanation for his subjects' preference.

The Memorial Consequences of Subliminal Messages

Our inability to detect many of the embedded messages that Key imbues with such effectiveness is not the major issue, although as we discuss later, the presence or absence of the subliminal messages is construed to be the whole issue by many in the media and by the public in general. However, we thought a contribution could be made regarding the issue of whether such messages affect our behavior, if indeed they are there. One claim made repeatedly by Key (1976) is that advertisers embed the word *sex* in their advertising copy and, indeed, in their products as well (such as Ritz crackers), because, he argues, enhanced memorability is gained through such implicit sexual associations. We chose to test this one important claim.

Using a set of vacation photographs, we produced three sets of experimental slides: one set in which the word *sex* was embedded three or four times on each slide, another in which nonsense consonant-vowel-consonant syllables were embedded in the same locations in which *sex* had been embedded, and a third in which no embedded materials were used. Subjects studied an equal number of each slide type in preparation for a test of retention. None of the subjects reported having seen the word *sex* on any of the slides nor anything else unusual about the slides, although they were quite capable of seeing it when the embedding was pointed out to them. On the test of retention, the subjects were presented with the original unaltered slides and an equal number of distractors and were asked to indicate for each slide whether they had previously seen it. One half of the subjects were tested immediately, and the remainder were tested two days later, because Key frequently has suggested that the effects of subliminal material may not appear immediately but may require an incubation period of some unspecified length. For this reason, the relevant behavior (buying the product) may not occur for some time, rendering the issue of paternity somewhat difficult but, for Key, theoretically convenient.

Despite Key's claims and concerns, slides that had been sex-embedded during initial exposure were no better recognized than slides in either of the two control conditions. Nor did retention of the originally sex-embedded slides improve as a function of retention interval. Rather, there was a significant reduction in recognition accuracy between the immediate and the 48-hour condition, suggesting that the task was not so difficult as to mask the effects of a powerful variable like retention interval. A reading of Key's books would lead one to predict an effect of sex-embedding beside which even the effects of retention interval would pale.

Comprehension of Backward Messages

Our research on auditory backmasking was designed to test two of the more contentious of Greenwald's claims. First, as with subliminal visual messages in advertising, we investigated whether the content of backward messages exerts an influence on the listener (consciously or otherwise). Second, we investigated whether the messages purported to be recorded backward within rock music reasonably could be attributed to active construction on the part of the listener rather than to the content of the recording itself (cf. Thorne & Himelstein, 1984). We also investigated the subjects' sensitivity to the physical or mechanical aspects of the backward messages, using the same materials and paradigms as those tasks involving content; this approach allows us to assess whether weak or nonexistent effects involving the content of the messages were a function of low power or a true lack of effect.

The messages we used included simple sentences and passages, some of which are well known (e.g., Lewis Carroll's *Jabberwocky* and the 23rd Psalm), and others that were constructed to meet the specific needs of the various experimental tasks. Each message was recorded in the forward direction and then re-recorded in the backward direction; the only "noise" on the tape was that of the messages themselves. To our ears, messages heard backward retain many of the properties of their forwardly presented counterparts. In fact, the messages appear speechlike and sound very much like a novel foreign language. Many of the physical components of speech such as trills, glides, pauses, changes in emphasis, and so on are retained (in a fashion) when an auditory message is presented backward.

Two groups of subjects completed the tasks: 34 introductory psychology students and 31 students from a class in cognitive psychology. After being given a short description of what was meant by backmasking and what was claimed by its proponents, the subjects were asked to rate their degree of agreement with the statement, "It is possible to understand messages played backward." Analysis of these ratings indicated that, on average, the subjects did not agree with the statement but that introductory students expressed significantly less disagreement with the statement than did the cognitive psychology students. However, despite their more positive outlook on the possibilities for backmasking, the performance of the introductory students did not differ significantly from that of the cognitive psychology students on any of the subsequent experimental tasks—including those tasks designed to simulate the methods of backmasking proponents. The latter result suggests that although people may differ in their beliefs about the effects of backmasking, these differences, as we demonstrate below,

do not make the alleged effects of these messages any more real.

What Can People Do With Backward Messages?

When asked to discriminate among backwardly presented passages on the basis of physical parameters, our subjects demonstrated that such tasks are remarkably easy. Given a series of randomly ordered messages, one half spoken by a female and the other half spoken by a male, the subjects discriminated the sex of the speaker with an accuracy of 98.9% correct—a highly significant difference from the chance expectation of 50%. Similarly, the subjects were able to discriminate paired backward passages spoken by the same male individual from those spoken by different male individuals with an accuracy of 78.5%. For that matter, the subjects also demonstrated a slight but significant capacity to determine the language in which the messages were recorded originally. When presented with backward messages repeated in English, French, and German in a random order and asked to assign each passage to its appropriate language category, the subjects sorted a significant 46.7% of the messages correctly, compared to a chance expectation of 33.3%.

Tests of Conscious Comprehension

Many people believe that the breaks and pauses within the speech stream occur primarily as pauses between words. In fact, in normal speech, the endings of many words often are run together with the beginnings of subsequent words, whereas many of the breaks and pauses in the speech stream are associated with syllabic breaks. Thus, the frequency of breaks and pauses in the speech stream is a rather poor correlate of the actual word count. We attempted to capitalize on this phenomenon in order to investigate the extent to which our subjects were capable of assessing the forward meaning of backwardly presented messages. We constructed two sets of sentences: one in which the sentences were matched for the number of words they contained but varied in the number of syllables, and the other in which the sentences were matched for the number of syllables but varied in the number of words. The subjects' task was to estimate the number of words each sentence would contain if it was heard in the forward direction. Our reasoning was that if the subjects were capable of assessing the forward meaning of the sentences, their word-count estimates would covary to a greater extent with the sentence variability of those items that varied in number of words (i.e., were matched for number of syllables), than those items that varied in number of syllables (i.e., were matched for number of words). Conversely, if the subjects were unable to assess the forward meaning of the sentences, they would be unable to

parse the sentences into word units and, thereby, would use the frequency of breaks (pauses, changes in stress, etc.) in the backward stream as a reflection of the number of words in the sentences. If so, their estimates would covary more with the sentence variability of those items that varied in the number of syllables than those items that varied in the number of words. Analysis of the subjects' estimated word counts indicated that they were influenced significantly more by variation in syllable frequency than by variation in actual word count, as would be expected if they were using the frequency of syllabic breaks rather than the actual number of words to derive their estimates.

The word-count task included a secondary task for the subjects. After estimating the number of words in a given sentence, the subjects were read (in the forward direction) a single word that either was or was not one of the words in the sentence they had just heard, and they were then asked to indicate whether they thought the word was one of those that had been reversed in the previous sentence. Their recognition accuracy of 55.8% correct was just slightly better, although significantly so, than the chance level of 50%. Thus, the results of the two tasks combined suggest that although the subjects may be able to detect (or, more likely, to reconstruct) the occasional word of a backwardly recorded message, very little of the forward meaning is consciously available.

Tests of Unconscious Influence

The proponents of backmasking argue that the effects of greatest concern are not the consciously perceived meanings of backward messages but rather those effects arising from unconscious or subliminal apprehension of the (forward) meaning of the material. Consequently, we also used tasks that required less in the way of conscious apprehension of meaning. We reasoned that if some subconscious mechanism existed for the interpretation of backward messages and their influence upon behavior, then this mechanism should allow decisions to be made about content without necessarily revealing that content. For example, one of the tasks we used was presented concurrently with the aforementioned sex-of-speaker task. After the subjects made their highly accurate judgments of the sex of the speaker for a given backward message, they were required to indicate whether they believed that the message, if heard in the forward direction, was a question or a declarative statement. At no time were they asked directly about the meaning of the sentences. Yet, in direct contrast to their ability to assess the sex of the speaker of the message, the subjects demonstrated no ability to discriminate statements from questions. Their accuracy of 52.1% correct was not significantly different than the chance level of 50%.

Another of the tasks we used was the semantic analogue of the voice-recognition task discussed earlier. The subjects were presented with pairs of sentences and were asked to indicate whether they believed the two sentences of the pair, if heard in the forward direction, would have the same meaning. The sentences in one half of the pairs were constructed to have the same semantic content (meaning) but to vary acoustically, by using either the active or the passive voice, whereas the sentences in each of the remaining pairs were constructed to differ in meaning. In marked contrast to their accuracy in discriminating sentence pairs spoken by the same speaker from those spoken by different speakers, only 44.81% of the subjects' judgments in the present task were correct—an accuracy moderately, although significantly, *less* than the chance expectation of 50%.

In a related task, the subjects were asked to judge whether each of a set of sentences, divided equally into meaningful and nonsensical sentences, would make sense if heard in the forward direction. The subjects' judgments were significantly related to the meaningfulness of the sentences, but, as with their earlier judgments of semantic relatedness, the relationship was reversed; their accuracy of 45.2% was moderately less than that expected on the basis of chance (50%).

In another attempt, we asked our subjects to sort backward statements of the sort "Jesus loves me, this I know" into one of five content categories: nursery rhymes, Christian, satanic, pornographic, and advertising. As with the other semantic tasks, if the meaning of backward messages is gained at a subconscious level, placement of these statements into the five categories should proceed in some nonrandom fashion. It would be a devious unconscious mechanism indeed that allowed Christian messages to be labeled as pornographic or satanic and vice versa. But that was the result we obtained. Of the ten judgments (two of each category) that we asked of each of our subjects, only 19.4% were accurate, which is not significantly different from the 20% expected on the basis of random assignment. In short, whether the requested judgments were about semantic relatedness, meaningfulness, the type of sentence (question or statement), or semantic category, the meaning of the statements appears not to have been understood at any level, conscious or otherwise.

Proponents of the backmasking thesis argue that the effects of listening to backward messages are manifested in an unconscious manner on the listeners' subsequent behavior. In this way, they intend to account for what they see as the common consequences of listening to rock music. In their view, the use of illicit drugs, the frequency of illicit sex, and so on occurs because the listener is led unwittingly in this direction by the unconscious influence of backward

messages within the music that promote such behaviors, although some influence also is attributed to the forward content of the music. To investigate this claim, we decided to see whether, through prior exposure to backward messages suggesting a particular bias in behavior, we could induce our subjects to behave in a manner in which, without the biasing, they would not normally behave. Because the promotion of illicit drug use and the like violated our sense of ethics, we chose something more innocuous: spelling.

After listening to a series of backward sentences, the subjects were asked to spell a list of common words read aloud by the experimenter. Unannounced to the subjects, two thirds of the words were homophones—words such as *read* and *reed* that sound alike but have different meanings and spellings. Each homophone was chosen to have its alternate spellings differ to a large degree in frequency of use as determined by the Galbraith and Tachman (1969) norms. The backward messages presented prior to the spelling task were sentences such as “Climbing a mountain is a remarkable *feat*” and “A saxophone is a *reed* instrument” that biased the low-frequency spelling of one half of the homophones on the spelling test; the other half served as controls. Previous research (e.g., Jacoby & Witherspoon, 1982) has shown that the spelling of homophones previously biased by the presentation of *forward* sentences is remarkably sensitive to this prior influence even when listeners have been unaware (as assessed by a test of recognition) of having previously heard the homophones in question. Those homophones previously biased are much more likely to be spelled in the low-frequency or biased direction than are previously unbiased homophones. Thus, in our version of the task, if the subjects are comprehending the backward messages unconsciously, their spelling of the biased homophones should reflect that comprehension.

However, our results demonstrated that the particular meanings assigned to the homophones in the backward messages had no effect on the tendency of the subjects to provide low-frequency spellings for them. Taken together with the results of the other tasks, we could find no evidence that our listeners were influenced, consciously or unconsciously, by the content of backward messages.

Task Sensitivity

It should be emphasized that we went to some length to equate the parameters of the semantic and physical tasks in an attempt to dispel concerns over the robustness of our investigations into the semantic effects of backward messages. For example, as outlined earlier, our type-of-sentence task (question or statement) was run concurrently with the sex-of-speaker task. Because both judgments occurred at the same time, on the same backward messages, and with the same

level of chance accuracy, the extreme difference in the accuracy of the subjects' judgments across the two tasks must have occurred as a function of some difference intrinsic to the judgments themselves rather than in the experimental materials or task setting. Similarly, the task requiring judgments about the similarity in meaning of paired backward sentences was constructed as the semantic analogue of the task requiring judgments about the similarity of the speakers of paired messages. Again, the large difference in performance across the two tasks suggests that the subjects' inability to achieve better than chance levels of performance in the semantic tasks is not a consequence of a weak experimental test but rather a true lack of effect.

“’Twas Brillig and the Slithy Toves”

The final task we presented to our subjects was an attempt to explicate the one unequivocal claim of the proponents of the backmasking thesis. Specifically, there is no question that Pastor Greenwald and many people in his congregation hear “messages” in popular music played backward. What is clearly at issue, however, is the *source* of these messages. Although Greenwald and others find it necessary to propose some external agent, be it Satan or evil-minded producers, to account for the presence of the messages they hear, we suspected that the source of the messages could be found in the listeners themselves. A small minority of the alleged backward messages in popular music apparently have been inserted intentionally. However, in the vast majority of instances, in line with the effects of mental set and expectation on the interpretation of ambiguous visual and auditory stimuli that are well-known in the psychological literature and to generations of cloud-watchers, we thought it was possible that given a very ambiguous auditory signal like backward speech, listeners should occasionally be able to “hear” something intelligible without the “message” actually being there.

The task we used has since become one of our more popular classroom demonstrations of the effects of “top-down” processing and has been the one preferred by radio and television producers who wish to provide a short, effective demonstration of our research for their audiences. The materials for the task consisted of readings of Lewis Carroll’s *Jabberwocky* and the 23rd Psalm rerecorded backward. The *Jabberwocky* passage was chosen because its meaninglessness in the forward direction seemed apropos of the backmasking thesis, and more seriously, because the “detection” of intelligible phrases in the backward stream would occur in the virtual absence of any possible perception of forward meaning. The 23rd Psalm was used because, according to Greenwald and others, religious material is free of backward messages.

Several creative listenings of the backward pas-

sages allowed us to "detect" a number of sequences that could be interpreted as sounding like something meaningful. For example, within the backward stream of *Jabberwocky* we detected such phrases as "Saw a girl with a weasel in her mouth" and, to our delight, "I saw Satan." That is, it seemed to us that the sounds at certain points in the recording were consistent with these interpretations. In total, we detected 12 such phrases, six for each passage. During the playing of each of the two passages to our subjects, counterbalancing ensured that only one half of the phrases for which the subjects would be asked to listen would be consistent with sections of the passage. The remaining phrases, also "detected," but in the alternate backward passage, served as control phrases.

Testing consisted of asking the subjects to listen for each of the phrases in question in a given passage and to indicate whether they thought they heard it. For each phrase, the entire passage was played to the subjects, and all testing on one passage was conducted before testing on the other. Overall, the subjects' percentage of agreement with the experimenters' assignment of the passages was 84.6%—a highly significant difference from the chance expectation of 50%. Simply put, the subjects "heard" the phrases detected by the experimenters for a given passage and did not hear those that the experimenters had detected for the alternate passage.

Although perhaps obvious, the result is important. First, it demonstrates that people do in fact "hear" intelligible phrases in streams of backward speech. Second, and contrary to the claims in many reports of this result in the popular media, the result also demonstrates that people cannot be induced to "hear" virtually anything in backward speech, as might be thought given a simplistic interpretation of the effects of mental set and expectation. Rather, the phrase for which they are asked to listen must be consistent with the sequence of noise at some point in the passage before it will be acknowledged as having been heard. By itself, however, the result does not address the main point of contention about the source of the phrases that people acknowledge as "hearing" in backward speech. In fact, the finding that the phrases must at least be consistent with noises in the backward stream could be interpreted as partial support for the backmasking proponents' claim that the messages are indeed present and not merely the result of suggestion and listener gullibility.

To address the point, we included a surprise secondary task for our subjects. After having listened to the *Jabberwocky* passage five times in their attempts to detect the suggested phrases and having recorded their judgment about a particular phrase chosen to be consistent with a section of the backward passage, the subjects were asked to indicate whether they had "heard" the present phrase in any of their previous

times through the passage. Of the 83.1% of the subjects who indicated that they "heard" the phrase when asked to listen for it, 81.5% indicated that the current trial was the *first* time they had heard it. In short, an ambiguous passage like that of *Jabberwocky* or the 23rd Psalm played backward may be heard many times without detection of even those phrases that are consistent with sections of the backward stream; however, when listeners are prepared to hear the sequences, they do hear them.

In summary, despite large effects in tasks requiring discrimination on the basis of physical parameters of backward speech, we could find no evidence that subjects are influenced either consciously or unconsciously by the semantic content of backward messages. On the issue of the alleged presence of backward messages, our results suggest that people's perception of these messages is most likely a function of active construction on the part of listeners. It is significant to note that in his public demonstrations, Greenwald does not ask his audience simply to listen to the reversed passages and thereby "hear" the messages that he hears. Rather, as was found necessary to the perception of messages in our research, Greenwald prefaces presentation of each passage with a statement of what the listener is to "hear." Under such conditions, it is not surprising that most listeners "hear" the messages for which Greenwald has prepared them, but it is poor evidence for the actual existence of such messages and even poorer evidence that the passages allegedly containing such messages have the baleful influences attributed to them.

The Public Forum and the Media

After our research had been completed, we gave a public presentation of the results to a large audience at the local public library. Our presentation emphasized the distinctions made in this article and, to a considerable degree, drew on well-known phenomena and theoretical positions in perception and cognitive psychology. The media's coverage of the event was presented first in a short radio report on a local station that was soon picked up by the various wire services in Canada and the United States. Given the original short report, it was not surprising to witness even shorter accounts in other radio reports and in national and local papers. What we had not anticipated, however, was the considerable creativity with which our research and comments would be treated.

Following the initial wire service report of our research, we were deluged with requests for radio and television interviews. Initially, we were pleased to grant them. But after witnessing the treatment our comments received, we have become less enthusiastic about the whole enterprise. On one occasion, for example, one of us agreed to do an interview for radio over the telephone only to discover when contacted

at the designated time that he was the "guest" on an open-line radio talk show. Needless to say, it is difficult to present the rationale for and results of scientific research while being berated by callers for being responsible for everything from satanism to teenagers' alleged disrespect for their parents. On another occasion, for the nationally televised Canadian production *W5*, over one hour of filmed interview material was reduced to about 30 seconds when aired, which, given its context in the program, was probably interpreted by viewers as suggesting that we actually had found satanic messages in rock music. However, the reports were not uniformly bad. Although it was rare, some reports (CBC's national science radio show, *Quirks and Quarks* ["Subliminal Messages," 1983], and Tisdall's [1983] article being the most notable) managed to do a creditable job despite being as limited by both time and space as their less admirable counterparts.

As we came to realize, the problem with media reports of our research could not be attributed, at least not solely, to sloppy reporting or to a desire on the part of reporters, headline writers, and radio and television producers to play fast and loose with the facts in the service of a "good" story. Rather, the consistency with which our research has been misrepresented points to a more general problem: a failing on the part of the media and the public alike to appreciate the methods and distinctions necessary for scientific investigation. Indeed, the numerous interviews we have given on the topic have convinced us that most people conceptualize the issue in much the same way as Key and Greenwald. To many of the various interviewers we encountered, the only question was whether backward satanic messages could be shown to be recorded in rock music, not whether such messages exerted any effect, subliminal or otherwise, upon the listener; it was simply assumed that the latter followed from the former. Some failed to see the distinction, and most were disappointed when we explained that the primary focus of our research had been the latter question. We carefully drew the distinction during interviews, and in later interviews, explicitly requested that the distinction be placed forefront in the interviewer's report, emphasizing that we did not investigate satanic messages in rock music *per se*. Despite these precautions, we continually were surprised to find that the distinction was only rarely included, and when it was, it was almost always misrepresented or distorted. Repeatedly, after devoting considerable effort to clarifying what we had and had not done and what the issues were from a scientific perspective, we would be confronted with such headlines as "Professors Find no Satanic Messages in Rock Music." Most readers probably failed to realize that such headlines were true only in the sense that we never looked for satanic messages in rock music. Thus, it is not surprising that we never found any.

There is no question that a large part of the public interest in our work stems from its association with purported satanism and the "evils of rock and roll." But the failure of many people to grasp what to us were obvious and important distinctions and the further failure to see the relevance of our work once the distinctions were understood stands as a clear demonstration of the public's misconception of scientific investigation. Apparently, as scientists we have impressed the public with our conclusions about many issues, but we have been far less successful in impressing upon them the often mundane methods we use to arrive at the conclusions we produce.

Epilogue

We mentioned earlier that at the time we began our research, the legislature in Arkansas had passed a proposal to require the affixing of labels on rock music warning the purchaser of the hazardous effects of subliminal backward messages on the records. Whereas it is somewhat amusing to conjure up an image of some august "rock recording review board" listening imaginatively to hundreds of rock albums played backward, in our view the costs incurred by such a program both monetarily and in the reduction of civil liberties would be serious. By the time our research had been presented in the media, the bill was lying on the desk of the governor of Arkansas. We cannot be certain of what happened from that point on, but coincident with a large front-page story of our research in the *Arkansas Democrat* (Ridlehoover, 1983), the bill was returned to the senate for review, where it was promptly defeated. Once again, considering the limited amount of additional material made available, the uncritical acceptance of a "scientific" conclusion by those in government is indeed surprising. We suspect that the legislators, like the media, also thought that "professors find no satanic messages in rock music." At least in one respect, they were correct.

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