

## Self-Perpetuating Development of Encoding Biases in Person Perception

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It was hypothesized that encoding (interpretive) biases may develop in a self-perpetuating manner through biased, self-supportive encoding (even in the absence of any objectively supportive evidence). This process was investigated in 3 experiments with different stimulus materials (matrices of digits, silhouettes of persons, descriptions of personal problems). In the learning phase of each study, Ss nonconsciously acquired some encoding bias. In the testing phase, Ss' encoding of new material was predictably biased, and, consistent with the self-perpetuation hypothesis, the strength of the bias gradually increased over the segments of the material, even though the material did not contain any evidence supportive of the bias. Given the ambiguity of many (particularly social) stimuli, the self-perpetuation process may play a ubiquitous role in the development of interpretive categories and other individually differentiated cognitive dispositions.

It has been demonstrated that encoding processes impose preexisting categories (or prototypes) on stimuli even if the stimuli do not match the categories perfectly. This process has been shown in a number of studies on pattern recognition and prototype abstraction (e.g., Posner, Goldsmith, & Welton, 1967), person perception (e.g., Cantor & Mischel, 1979; Higgins, King, & Mavin, 1982; Nisbett & Wilson, 1977), and more recently in research on the acquisition of information about covariation and its influence on subsequent encoding processes (Lewicki, 1986a, 1986b; Lewicki, Czyzewska, & Hoffman, 1987; Lewicki & Hill, 1987; Lewicki, Hill, & Bizot, 1988).

If an encoding rule implies a relation between features  $x$  and  $y$  and the perceiver encounters a stimulus that is clearly  $x$  but ambiguous regarding  $y$ , then the stimulus is likely to be encoded as being both  $x$  and  $y$  (i.e., the ambiguity as to whether the stim-

ulus is  $y$  or not  $y$  will be resolved and encoded in favor of  $y$ ). For example, if the encoding rule implies a positive covariation between green eyes and intelligence, then ambiguous behavior (regarding intelligence) of a newly encountered person with green eyes is likely to be encoded as intelligent rather than unintelligent.

The dominant view, based on numerous empirical studies, is that memories derived from perception and memories derived from thought are "entangled" (e.g., Anderson, 1985; Cofer, 1973; Lachman, Lachman, & Butterfield, 1979; Neisser, 1967), and despite sometimes successful "reality monitoring" (Johnson & Raye, 1981), people usually cannot distinguish clearly between what has actually happened and what they think has happened (Slusher & Anderson, 1987). Moreover, there is evidence indicating that biased encoding of stimuli (as being more consistent with the encoding inferential rule than they actually are) may occur even when subjects are not aware that they are making any inferences. Instead, subjects often believe that they actually "see" the features that are in fact only inferred (Lewicki, 1986a).

Thus, as a result of the inferential processes involved in encoding, the final encoded (and memorized) representation of a stimulus consists of both the objective features of the stimulus (i.e., those features that were actually present in the external world and "noticed" by the perceiver) as well as the subjective features that were not present (or objectively could not be "noticed") but only inferred by the perceiver. This distinction between what is actually noticed in the external world and what is only inferred on the basis of some inferential rule is, in fact, somewhat artificial, and it does not imply that these two kinds of information assume differential status in memory.

Most information that is eventually stored first has to be en-

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coded; therefore, most information stored in memory is the result of some inference process (even if this inference process is limited to very low-level and high-probability inferences such as those involved in the encoding of simple shapes or figures [Hochberg, 1978]; for a different view, see McArthur & Baron, 1983). Thus, it is reasonable to assume that a stimulus encoded as being consistent with (i.e., supportive of) a respective encoding rule is stored in memory in the same way regardless of whether its consistency with the rule was due to its actual fit being accurately detected by the perceiver or rather was entirely due to the biased encoding of its ambiguities. In other words, the experience of perceiving a stimulus as being both  $x$  and  $y$  is memorized in the same manner regardless of whether (a) both features ( $x$  and  $y$ ) were actually noticeable and noticed by the perceiver, or (b) only feature  $x$  was noticeable and noticed, whereas the stimulus was ambiguous regarding feature  $y$ , and thus its presence was only inferred on the basis of some preexisting (correlational) encoding rule stating that if  $x$  is present, then  $y$  is also present.

This issue is of major importance because encoding rules develop as a function of individuals' subjective experiences, and if these experiences are found to be supportive, then the rules become gradually stronger and more resistant to change (Hochberg, 1978; Lewicki, 1986a, 1986b; Lewicki et al., 1987). If the respective real (i.e., corresponding to the external events) and inferred (in the process of encoding) portions of memory representations of stimuli are not stored separately or in an otherwise clearly differentiated manner (and it is likely that they are not), then the encoding rules should display a general tendency to produce self-supportive memory representations whenever stimuli are ambiguous. This, in turn, should lead to a gradual self-perpetuating development (i.e., strengthening) of the encoding rules, and the process may be relatively independent from the actual nature of external reality (as long as this reality is sufficiently ambiguous to be open to biased encoding).

We designed the present series of experiments to test the hypothesis of the self-perpetuating development of encoding biases. We assumed that once a stimulus is encoded as being consistent with the encoding rule, it will be stored as such regardless of whether the stimulus is objectively consistent or only encoded as consistent because of the biased inferential rules used in the encoding process. Therefore, a hypothesized general characteristic of encoding rules is their tendency to convert ambiguous stimuli into self-supportive evidence.

The first 2 experiments reported here followed the same general design. During the learning phase of the experiments, subjects were exposed to stimulus material containing a consistent but not salient (hidden) covariation between two features,  $x$  and  $y$ . On the basis of previous research on the processing of information about covariations (Lewicki, 1986a, 1986b; Lewicki et al., 1987) we expected that subjects would acquire some procedural knowledge about the covariation, and that this knowledge would bias their encoding of new stimuli. For example, stimuli that are clearly  $x$  but ambiguous regarding  $y$  would be encoded as being both  $x$  and  $y$ . In the testing phase of the experiments, subjects were exposed to a long series of stimuli that were relevant to the covariation learned in the first phase (in the sense that they were unambiguous regarding  $x$ ), but were neither con-

sistent nor inconsistent with the covariation (i.e., ambiguous regarding feature  $y$ ). Thus, in the testing phase stimulus material was open to the expected biased encoding (as consistent with the encoding rule acquired during the first phase), although objectively the material was completely ambiguous regarding its actual consistency with the rule. On the basis of the self-perpetuation hypothesis, we expected that the encoding bias would gradually increase over the segments of the testing phase; that is, subjects' encoding was predicted to become gradually more consistent with the covariation learned in the first phase.

The first of the following two experiments investigated the self-perpetuation process using simple, nonsocial stimulus material; subjects were searching for a target digit in matrices of numbers. The second experiment used social stimulus material; subjects were judging the likability of stimulus persons. The third experiment was a quasi-experiment designed to test the predictions of the self-perpetuation hypothesis under seminatural conditions.

## Experiment 1: Finding a Nonexistent Target (Matrix Scanning)

### *Method*

#### *Matrix-Scanning Paradigm*

The matrix-scanning procedure has previously been used in a number of studies on the acquisition of information about covariations (Lewicki, 1986a; Lewicki et al., 1987). In those experiments, subjects were asked to view a succession of matrices of visual distractor characters (digits) and to search for the location of a target character (usually the digit 6) within each matrix (see Figure 1). There was a control box with four buttons corresponding to the four quadrants of the matrix, and the subjects' task was to respond to each (consecutively displayed) matrix by pressing the appropriate button corresponding to the identified location of the target.

In a typical matrix-scanning experiment, a set of four different matrices (i.e., background distractors) was used, and the material was arranged so that each of the matrices systematically co-occurred with a unique quadrant location of the target (e.g., if Matrix 1 was displayed, then the target was always located somewhere within the lower right quadrant). Although none of the subjects in these experiments consciously detected the manipulated pattern (i.e., the co-occurrence between matrices and target locations), they still acquired some procedural knowledge about that pattern: Their performance (measured by the latency and accuracy of their responses) varied predictably with the changes in the manipulated pattern across segments of the material. For example, when a segment of the material did not follow the previously manipulated (and learned-by-the-subjects) pattern, subjects' performance deteriorated; however, the performance returned to normal when the original pattern was reinstated.

#### *Overview*

The matrices shown to subjects in this study were similar to those used in previous studies. They consisted of 36 characters ( $6 \times 6$ ) and were divided into four quadrants; however, unlike in the previous studies, the distractor characters were not digits but uppercase letters (A, B, C, D, E, G, H, J, and K; see Figure 2). The target was the digit 6, and as in the previous studies, its location (i.e., the quadrant in which it was located) was predictable from the background matrix of letters. Four

matrices were used, and in each of them the target was displayed in a different quadrant (e.g., if Matrix 1 was displayed, then the target was always located somewhere within the lower right quadrant; if Matrix 2 was displayed, then the target was located in the lower left quadrant, etc.).

As in the matrix-scanning procedure, there was a control box with four buttons corresponding to the four quadrants of the matrix. The subjects' task was to locate the target (i.e., the quadrant where the target was located) and then press the key corresponding to the target location on the control box. The experimental session was divided into a training phase and a testing phase. The training phase was similar to previous matrix-scanning experiments (Lewicki, 1986a) in that subjects were allowed to search for the target until they found it (usually after 2-3 s), but it was longer than in previous studies (288 trials).

The testing phase also consisted of 288 trials. Unlike in the learning phase, however, subjects were told that these matrices would be displayed "subliminally," and they were asked to respond (i.e., "guess" where the target digit was located) based on their intuition. The matrices were in fact displayed not subliminally but for only a very brief moment (100 ms). The duration of these exposures was chosen so that, with some effort, subjects could see (and potentially identify) the matrices, but they did not have sufficient time to scan them; thus, they could not notice that these matrices did not, in fact, contain any targets. Subjects' responses were expected to reflect encoding biases produced by the knowledge about the covariation that they had acquired in the learning phase of the experiment.

Participants were randomly assigned to either an experimental or a control group. They were exposed to the same sequence of 576 matrices (i.e., backgrounds of distractor letters): 288 during the learning phase and 288 during the testing or "guessing" phase. The difference between the groups pertained exclusively to the sequence of target locations during the learning phase and thus to the covariation between the matrices and target locations manipulated in the study. In the experimental group, there was a consistent covariation between the background matrices of letters and target locations, and this group was expected to de-

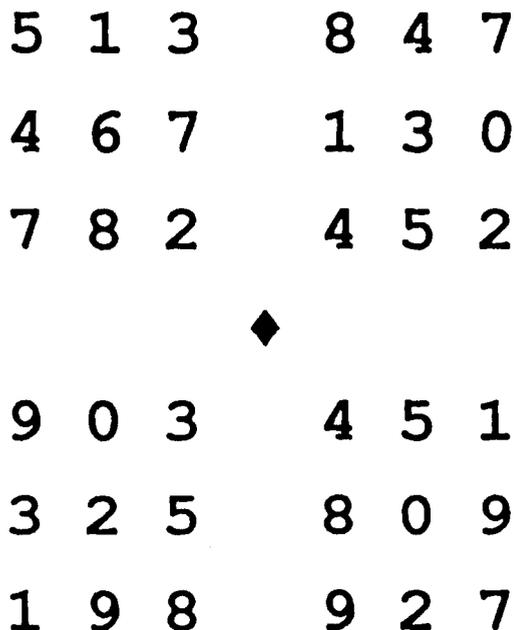


Figure 1. One of the matrices presented to subjects in the matrix-scanning procedure.

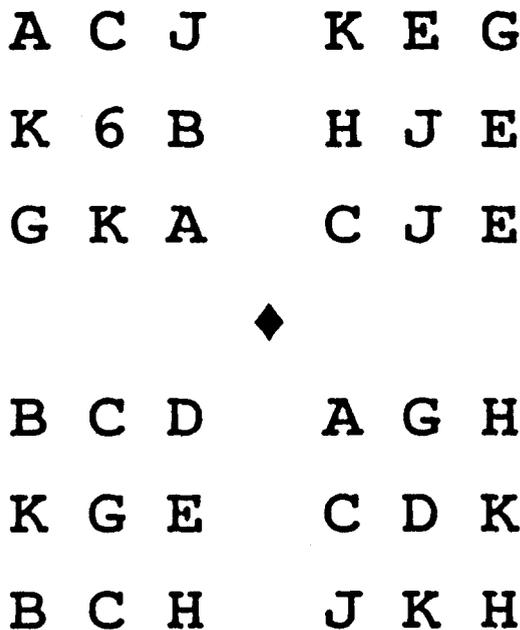


Figure 2. One of the matrices presented to subjects in Experiment 1 (matrix-scanning procedure).

velop encoding biases that would influence their responses during the testing (guessing) phase. In the control group, the target locations during the learning phase co-occurred randomly with the background matrices of letters, and therefore no encoding bias was expected to develop.

*Subjects*

A total of 68 undergraduate students (both men and women) participated for course credit.

*Stimulus Material and Procedure*

Subjects participated individually. The stimulus materials and all instructions were presented on a computer screen; the experimenters who introduced the apparatus to the subjects were blind to the experimental condition (the sequence of conditions for consecutive subjects was controlled by the computer program). The CRT screen was located at a distance of about 55 cm from the subject's eyes. All characters were 4.5 mm high and appeared as amber on a black background. Subjects were asked to use the index and middle fingers of their dominant hand and to respond as quickly and accurately as possible. They were also asked to focus on a small square in the center of the screen before the presentation of each matrix; this was explained as "a strategy leading to the fastest responses."

The matrices were presented in the center of the screen (i.e., the fixation point was in the center of the screen). A subject's response, which consisted of pressing one of four buttons, terminated the exposure of the matrix and triggered exposure of a mask, which was an analogous matrix consisting of Xs that substituted all characters of the original matrix. The mask remained on the screen for 500 ms.<sup>1</sup> There was also

<sup>1</sup> The ordinary 60-Hz microcomputer CRT was used, so the accuracy of display control was limited to the length of the refreshing cycle (±16.66 ms).

a 500-ms delay between the disappearance of the mask and the presentation of the next matrix, during which the CRT screen was blank.

Before starting the testing (guessing) phase, subjects received extensive instructions designed to prepare them for this (somewhat strange) task that required them to react to something they could not see; specifically, subjects learned that

this time each matrix will be displayed only for a very brief moment. The actual durations may vary somewhat from matrix to matrix, but they will always be so short that you will probably not be able to see the target number "6." In fact, many people cannot recognize any numbers in the matrices. If you don't see the "6," don't worry about it. Just make a guess about the location of the "6" and press the appropriate key.

Although the exposures are very brief, and even though you may not recognize the "6," you will still see it *SUBLIMINALLY*. If you relax and let your unconscious mind guide you to the location of the "6," your guesses will tend to be correct even when you don't think you know the answer. Therefore, it is important to let your unconscious take control of your reactions. To let your unconscious mind operate, you have to disengage your rational, thinking self and act on your intuition.

During the testing (guessing) phase, the fixation point (the small square) remained on the screen at all times. The matrices were exposed for 100 ms and were masked with an analogous matrix that consisted of X's substituting for all characters in the original matrix. The mask remained on the screen for 1 s after a subject's response, and then the next matrix was exposed. This length of exposure was not exactly subliminal; thus, we expected it to allow subjects to identify the matrices. However, it was much too short to allow them to search the matrices for the target.

The entire succession of 576 trials was separated by 10-s breaks. The breaks occurred after every 96 trials. During the breaks, subjects were encouraged to relax.

After the session, subjects were asked for any comments they might

have had about the task and were asked if they had noticed anything special in the stimulus material. The experimenter always encouraged subjects to express additional impressions and reflections and explained that it was very important to the investigation to learn from participants as much as possible about the procedure and how the stimulus material was perceived.

## Results

The means of response latencies for subjects' responses in the learning phase of the study (see Figure 3) indicate that, consistent with expectations, subjects in the experimental group made better progress over the three blocks of the task (i.e., their response latencies decreased faster) as compared with the control group. The difference is reliable, as shown in a  $2 \times 3$  (Condition  $\times$  96-Trial Blocks) analysis of variance (ANOVA) with repeated measures on the second variable that revealed a significant interaction between condition and block,  $F(2, 128) = 17.25$ ,  $MS_e = 4,242.83$ ,  $p < .001$ .

However, the main hypothesis (about the self-perpetuation process) pertained to the accuracy (i.e., consistency with the covariation) of subjects' responses in the guessing segment and specifically to the expected changes in accuracy. Figure 4 shows the mean accuracy of responses across three consecutive 96-trial blocks during the testing (guessing) segment, separately for the experimental and control groups.

The means suggest that, consistent with expectations, subjects in the experimental group showed a tendency to react to the (in fact "empty") matrices as if they perceived the target in locations consistent with the covariation manipulated during the learning phase.

The accuracy of control-group subjects remained unchanged

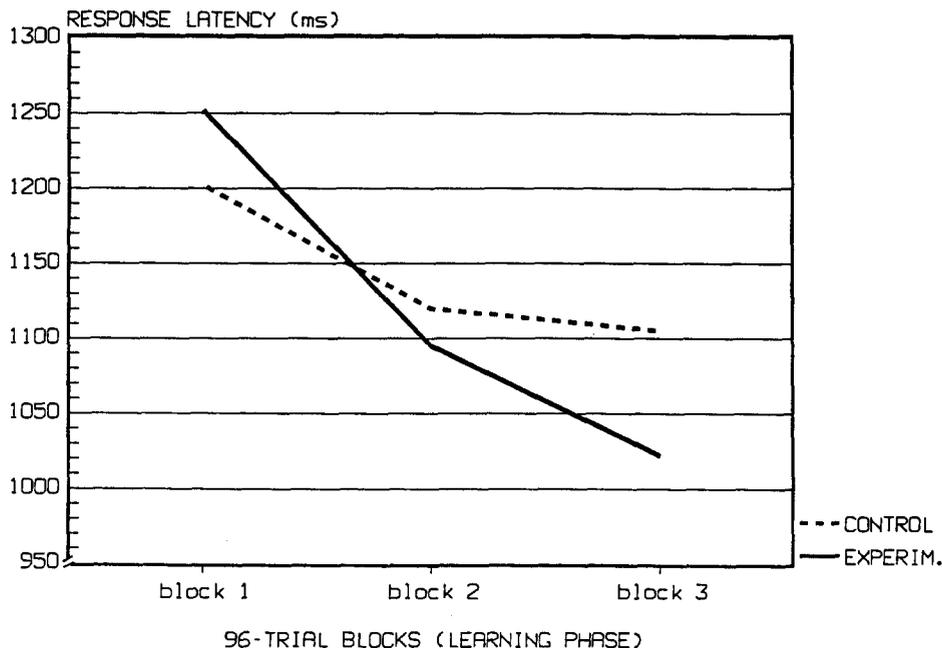


Figure 3. Mean response latency in three consecutive blocks of the learning phase: Experiment 1. (EXPERIM. = experimental.)

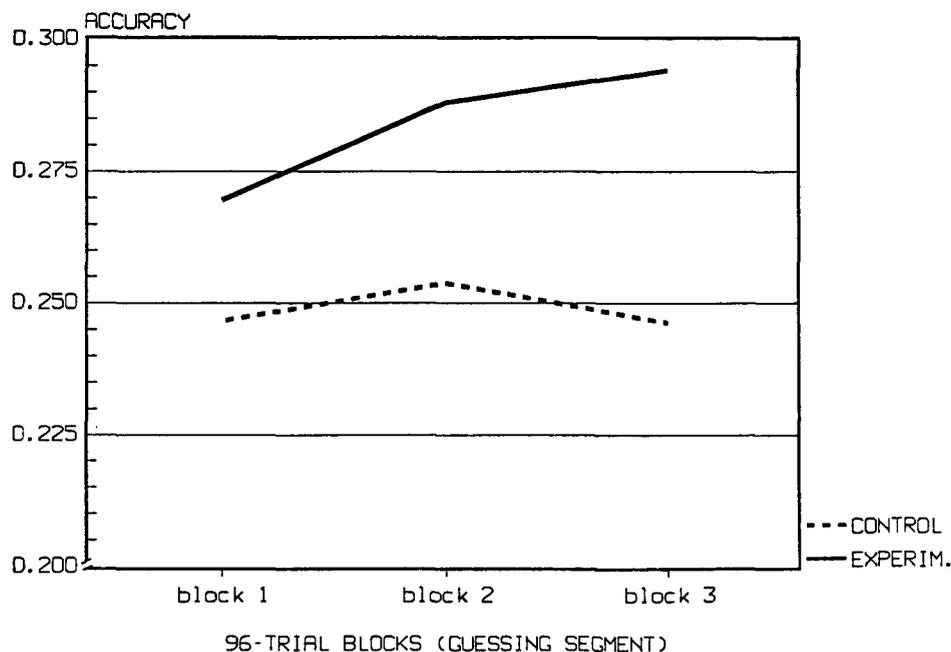


Figure 4. Mean accuracy in three consecutive blocks of the testing (guessing) phase: Experiment 1. (EXPERIM. = experimental.)

and close to the predicted chance level (.25) across the blocks of the testing (guessing) phase. The accuracy of subjects in the experimental group was not only better overall than the accuracy of subjects in the control group, but also gradually improved over the blocks, as predicted by the self-perpetuation hypothesis.

We analyzed these data with a  $2 \times 3$  (Condition  $\times$  96-Trial Blocks) ANOVA with repeated measures on the second variable. The analysis revealed a main effect for condition,  $F(1, 66) = 23.21$ ,  $MS_e = 0.0626$ ,  $p < .001$ , indicating that the accuracy of subjects in the experimental group was better overall. Moreover, planned comparisons (contrasts) revealed that, consistent with the self-perpetuation hypothesis, in the experimental group the accuracy of subjects' responses improved significantly across the blocks, linear trend  $F(2, 132) = 3.87$ ,  $MS_e = 0.0055$ ,  $p < .022$ , whereas no reliable differences between the blocks were found in the control group,  $F(2, 132) = 0.41$ ,  $MS_e = 0.0006$ , *ns*. Planned comparisons (contrasts) also revealed that the difference between the accuracy of experimental and control subjects was significant but smallest (borderline significant) in the first 96-trial block,  $F(1, 66) = 3.82$ ,  $MS_e = 0.0090$ ,  $p < .052$ ; larger in the second block,  $F(1, 66) = 12.53$ ,  $MS_e = 0.0200$ ,  $p < .001$ ; and much larger in the third block,  $F(1, 66) = 24.20$ ,  $MS_e = 0.0388$ ,  $p < .001$ .

In the postexperimental interviews, none of the subjects mentioned anything even close to the real nature of the manipulation (i.e., the covariation manipulated in the learning phase). This came as no surprise, as none of the subjects who participated in the previous matrix-scanning and similar matrix-location experiments (Lewicki, 1986a; Lewicki et al., 1987; Lewicki et al., 1988) had discovered the covariation. Matrix scanning

is a very attention-consuming task, and subjects have no spare processing resources to consciously compare the matrices. Also, none of the subjects expressed any suspicions regarding the actual presence of the target in the guessing segment.

One may posit that subjects in this experiment changed their strategy over the segments of the testing (guessing) phase, and that instead of scanning the briefly presented matrices, they focused on identifying them. Although this possibility cannot be entirely ruled out, it assumes that subjects were consciously aware of the manipulated covariation. This is inconsistent with the previous research using matrix scanning and seems unlikely: If subjects had consciously discovered the manipulated covariation (between the target locations and background matrices) of the experiment's learning phase, at least some subjects would surely have reported their "discovery" to the experimenter during the extensive debriefing (which each subject underwent). It seems that there was simply no reason why a subject would be compelled to hide the discovery of the covariation from the experimenter; quite to the contrary, reporting this discovery would, from the subject's point of view, have looked good because it would have attested to the subject's perceptiveness (with which this experiment was supposedly concerned).

## Experiment 2: Learning to Judge Likability from Kinematics

### Method

#### Overview

The general idea for the stimulus material used in this experiment was taken from a study by Runeson and Frykholm (1983) on the kinematic

specification of dynamics as an informational basis for person-and-action perception. Runeson and Frykholm found that subjects exposed to nothing more than a very limited amount of information about the dynamics of a stimulus person's movements can still make relatively accurate judgments about the person's gender, intentions, and so forth. Subjects in that study were exposed to a videotape presenting the motion of stimulus persons (walking, lifting objects, etc.). However, all that was visible on the videotape was small strips of fluorescent tape fixed to the stimulus person's forehead and joints; both the background and the person's body were completely dark and indistinguishable.

Before subjects in Experiment 2 were exposed to the experimental procedure, the idea of the kinematics study was explained to them; moreover, in order to make this cover story even more believable, they were given a copy of the *Journal of Experimental Psychology: General* article reporting the original experiment by Runeson and Frykholm (1983). Subjects were told that the current study was an attempt to determine whether Runeson and Frykholm's findings generalize to the area of personality judgments (i.e., whether people can make accurate personality judgments based on kinematic information). Then subjects were exposed to stimulus material similar to that from the original "kinematics" study; the stimulus persons who were presented were indistinguishable from the background except for marked points (strips) on their foreheads, elbows, wrists, knees, and ankles. The material was presented on a video monitor.

During the learning phase there were 26 episodes. Each episode was about 10 s long and presented a stimulus person engaging in a single, simple activity (e.g., opening and drinking a canned beverage, throwing a frisbee). Subjects were given information about the "likability" of each stimulus person at the beginning of each episode (the ratings of likability were ostensibly based on scientific case studies confirmed by peer ratings of each person).

There was a hidden covariation built into this stimulus material: The distance between the marked points on the ankles and knees was either 13 in or 14.5 in (i.e., the stimulus persons were either short legged or long legged), and this feature systematically correlated with likability. The difference between these two distances was hardly noticeable, especially given the fact that each episode was slightly different with regard to the distance between the stimulus person and the camera (and thus the absolute size of the stimulus person varied). Therefore, the crucial difference between the two types of episodes could be identified only in terms of the relation between the manipulated distance (ankle-knee) and the distances between other marked points that were constant. There were two experimental conditions. In one condition, all long-legged stimulus persons were presented as likable and all short-legged stimulus persons were presented as not likable. In the other condition, this covariation was reversed.

The testing-phase stimulus material consisted of 36 additional episodes. Unlike during training, subjects were not given any information about the likability of the stimulus persons, but were instead asked "to rate the likability based on" their "intuitions" (separately for each episode). At the end of the session, subjects answered a set of questions exploring their perception of the stimulus material and any comments they might have about the procedure.

On the basis of the previous research on the processing of information about covariations, we hypothesized that subjects would acquire knowledge about the covariation manipulated in the learning phase, and that this knowledge would influence their encoding of the testing-phase stimulus material. Specifically, we expected that subjects' intuitions regarding the likability of the testing-phase stimulus persons would be biased depending on the distance between the marked points on their ankles and knees. However, unlike in the previous research on the processing of information about covariations, the present testing-phase stimulus material consisted of more (as many as 36) trials to allow for

the expected self-perpetuation process. We hypothesized that the consistency of subjects' judgments with the previously acquired encoding bias (covariation between the distance between the crucial marked points and likability) would gradually increase over the testing phase.

### Subjects

A total of 41 female volunteers from undergraduate psychology courses at the University of Tulsa participated for course credit.

### Procedure

Subjects participated in small groups (3–6 persons each). On arrival at the laboratory, the experimenter handed subjects a copy of the article by Runeson and Frykholm (1983) published in the *Journal of Experimental Psychology: General*. The experimenter (who was blind to the experimental condition) explained that the current study was an extension of Runeson and Frykholm's research. Specifically, subjects were told that the current experiment was an attempt to determine whether people can, using their intuition, identify likable and less likable individuals solely on the basis of how they move. The experimenter then went on to explain that subjects would be seeing a videotape of several individuals performing very simple tasks (i.e., episodes) that require various movements; however, the videotape was specifically prepared so that subjects could only see several marked points on the respective person's limbs and head. Subjects were then shown 26 episodes (each 10 s long), presumably to familiarize them with the unusual material. At the beginning of each episode, the respective person's likability was announced, and the simple activity that the stimulus person was about to perform was identified (e.g., "This is a likable person lifting a heavy object" or "This is a nonlikable person drinking a canned beverage"). The likability of stimulus persons systematically covaried with the distance between the marked points on the knees and ankles (see Overview). Thus, these initial 26 trials constituted the training phase of the experiment.

Subjects were then shown 36 additional episodes (each 10 s long) containing stimulus persons who were not explicitly identified as being likable or nonlikable. The experimenter instructed subjects to "use their intuition" to rate the likability of the stimulus person depicted in each episode on an 8-point scale with the endpoints *not likable* (1) and *definitely likable* (8). The instruction did not stress subjects' own feelings for the stimulus persons (i.e., subjects were not asked to say how well they themselves liked each stimulus person); instead, it implied that likability pertains to some general characteristic of a person. These 36 episodes constituted the testing phase of the experiment.

*Stimulus material.* The stimulus material was prepared by videotaping one actor performing various simple tasks (e.g., opening a jar, tying a necktie, drinking a canned beverage, lifting a heavy box, etc.). The actor was dressed completely in black and was filmed in front of a black background. The actor's elbows, wrists, knees, ankles, and forehead were marked with bright white rubber bands. Thus, only these marked points were visible on the videotape. The recording was made in "negative mode" (i.e., the black background was recorded as white, and the white markings were recorded as black), so that the final videotape showed a white background with black markings identifying the actor's arm and leg joints and forehead. Examples of this stimulus material are presented in Figure 5.

Figure 5 also shows the crucial aspect of this stimulus material that was manipulated and that covaried with likability across the 26 episodes shown during the training phase. Namely, each training episode was recorded twice: once with the distance from the marks on the knees to the marks on the ankles being 13 in. (short-legged stimulus person), and another time with this distance being 14.5 in. (long-legged stimulus person). From these recordings, two different videotapes were pro-

duced, one for each experimental condition. This allowed us to show, during training, episodes depicting the same simple activities in exactly the same order with identical soundtracks (announcing the respective stimulus person's likability) in each experimental condition, while manipulating the distance between the crucial marked points.

In one condition, the tape was arranged so that short-legged stimulus persons were described as likable (short leg-likable); in the other condition, long-legged stimulus persons were described as likable (long leg-likable). The order of likable and nonlikable stimulus persons was randomized in blocks of four, so that within each block of four episodes two likable and two nonlikable stimulus persons were always shown.

The 36 testing episodes showed the actor performing different additional tasks, and each was produced in a similar manner. However, each episode was only filmed once, with either a short-legged or long-legged stimulus person. The order of episodes with short- and long-legged stimulus persons was again randomized within blocks of four, so that within each block of four episodes two always showed a short-legged stimulus person and two always showed a long-legged stimulus person.

The 36 testing episodes consisted of two logical halves (segments) of 18 trials each (i.e., Segment A—Episodes 1–18; Segment B—Episodes 19–36). To allow for the comparison between subjects' ratings of the first 18 episodes during testing and of the final 18 episodes (i.e., in order to allow for the test of the self-perpetuation hypothesis), two different testing tapes were produced. The difference between these tapes pertained to the order in which the two 18-episode segments were shown. For half of the subjects in each experimental condition, the testing phase

episodes were shown in A–B order (i.e., first Segment A episodes, then Segment B episodes); for the other half of the subjects in each condition, the episodes were shown in B–A order. Thus, any differences in the ratings of short- and long-legged stimulus persons between the first and the second half of the testing phase (aggregating across the A–B and B–A order) could not be attributable to the particular simple activities depicted in the respective episodes.

*Postexperimental questionnaire.* After the testing phase of the experiment, subjects were instructed to write down any observations or feelings that they had regarding the stimulus materials, particularly what they paid attention to when making their ratings. The experimenter urged subjects to write down as many observations as possible; presumably, it was important to the investigation to learn on which aspects of the stimulus material subjects focused their attention.

### Results and Discussion

Figure 6 shows the means of subjects' average ratings of short- and long-legged stimulus persons for each experimental condition, for each segment.

A 2 (experimental condition)  $\times$  2 (segment of the testing material)  $\times$  2 (length of leg) ANOVA of those ratings yielded a significant three-way interaction,  $F(1, 39) = 8.44$ ,  $MS_e = 0.405$ ,  $p < .007$ . Planned comparisons revealed that, consistent with expectations, in the short leg-likable condition the likability ratings of short-legged stimulus persons increased across segments,  $F(1, 39) = 5.67$ ,  $p < .03$ , whereas in the long leg-likable condition, it decreased across segments, although not significantly so,  $F(1, 39) < 1.0$ . The rating of long-legged stimulus persons decreased across segments in the short leg-likable condition,  $F(1, 39) = 4.54$ ,  $p < .04$ , and increased in the long leg-likable condition, although not significantly so,  $F(1, 39) = 1.83$ ,  $p < .19$ . Additional analyses revealed that this pattern was not affected by the order in which the two actual segments of episodes were presented during testing (see Method section; the four-way interaction of Order  $\times$  Condition  $\times$  Segment  $\times$  Distance was not significant,  $F[1, 37] < 1.0$ ). Thus, as expected, subjects rated the stimulus persons presented to them during the testing phase in a manner increasingly consistent with the covariation to which they had been exposed during the training phase.

The analyses of subjects' comments during debriefing revealed that none of the subjects mentioned anything even close to the manipulated covariation. Not a single subject reported having focused on the legs or lengths of limbs.

One may posit that perceptual enhancement (Jacoby, 1983; Jacoby & Dallas, 1981) or some other nonspecific increase in subjects' ability to identify the crucial aspects of the material could have mediated the observed changes in subjects' performance during the testing phase. However, this interpretation of the data does not provide a very convincing alternative to the self-perpetuation explanation. First, in this study all exposures were very long (10 s); thus, there was always enough time to identify the crucial cues (provided that one knew where to look). Moreover, although the manipulated feature was not salient (in the sense that it did not draw subjects' attention), it was so simple that identifying it did not require any training (see Figure 5) and could have been accomplished easily even in the very first trials (again, provided that one knew what was manip-

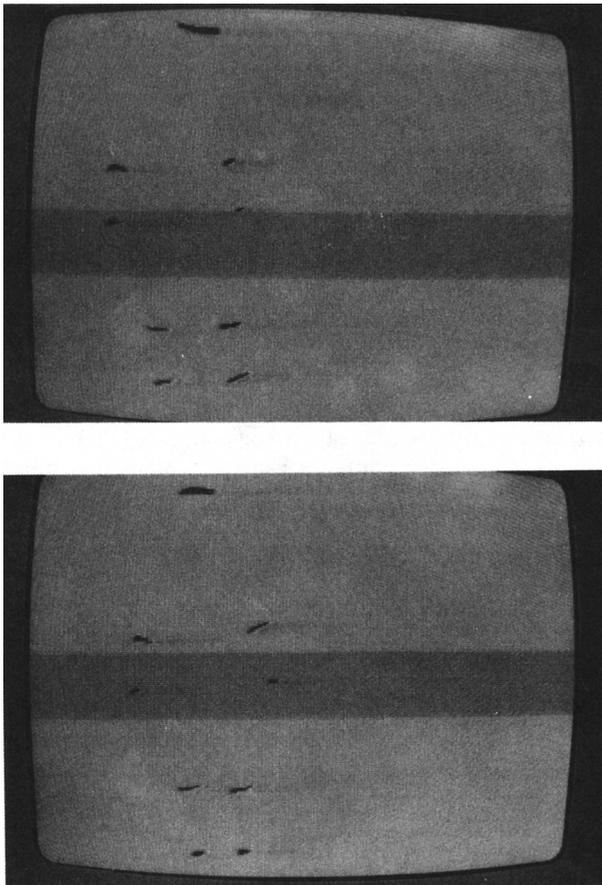


Figure 5. Examples of short-legged (top) and long-legged (bottom) stimulus persons: Experiment 2.

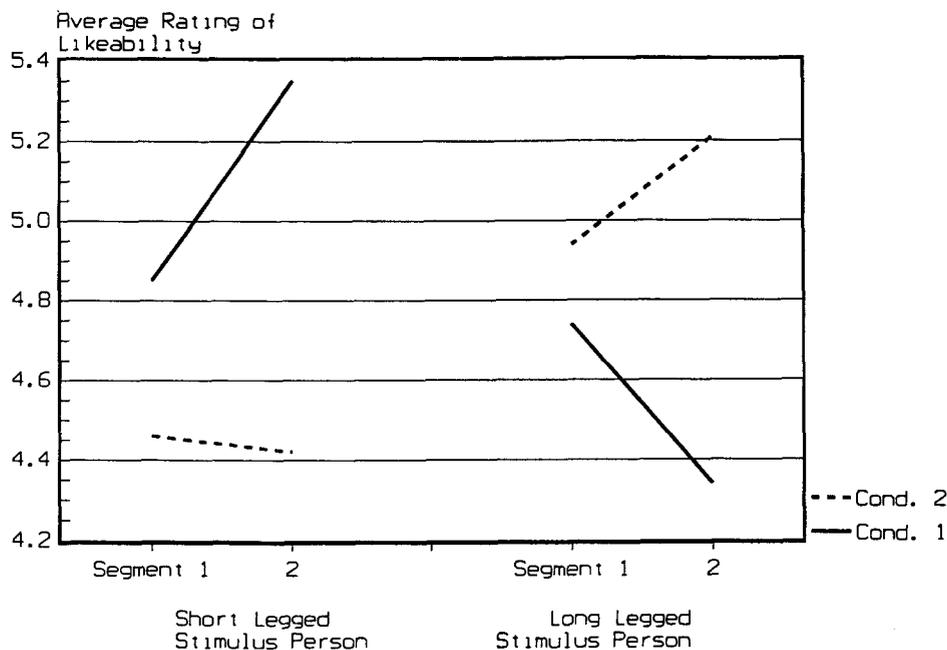


Figure 6. Average ratings of likability of short- and long-legged stimulus persons: Experiment 2. (Cond. = condition.)

ulated). An additional argument against this interpretation is the fact that in this study the same kind of material and the same exposure time were used in the learning and testing phases. Thus, even at the very beginning of the testing phase, subjects already had a good deal of experience with the stimulus material.

Another possible (alternative) explanation of these results is that subjects learned over time (during the testing phase) to attend to the leg-length cue. However, that possibility seems unlikely because it assumes that subjects had consciously controlled knowledge of the covariation manipulated in the learning phase. Moreover, provided that mere identification of leg length is a simple task (as explained in the preceding paragraph) that does not require training (assuming that one knows where to look), that possibility would imply that subjects acquired knowledge about the covariation over the testing phase, which is unlikely because the testing-phase material did not contain any evidence supportive of the covariation.

### Experiment 3: Self-Perpetuation of Person Perception Biases in Seminal Conditions

The expectation that the self-perpetuation process mediates the development of various person-perception dispositions in natural conditions is based on the assumption that the social stimuli that one encounters in everyday life are sometimes (or often) sufficiently ambiguous to allow for alternative interpretations and are thus subject to biased encoding. Experiment 3 was designed to test this assumption about the role of natural social experiences in the self-perpetuating development of encoding biases.

The first (learning) phase of this experiment was similar to those of the previous two experiments in that subjects were exposed to stimulus material containing a hidden covariation expected to trigger the development of an encoding bias. However, unlike in the previous studies, this phase was not followed by the controlled presentation of ambiguous stimulus material (open to biased interpretation and thus allowing the bias to self-perpetuate). Instead, after filling out a measure of the manipulated covariation, subjects were thanked for their participation in the experiment and did not expect that 2–3 weeks later they would be asked to participate in a follow-up study.

The manipulated covariation involved an ambiguous (hidden) personality characteristic. We hypothesized that the stimuli occurring in the natural social interactions that subjects would experience after the initial experimental session could functionally play the role of the “ambiguous stimulus material” segment used in the previous two experiments; that is, it would allow the process of self-perpetuation to advance. Thus, we expected that the initially acquired bias would be reliably stronger following a 2–3 week period, after which subjects were asked to return to the lab.

The covariation manipulated in this study involved the presence or absence of a personality characteristic that by definition was particularly ambiguous, namely, an anxiety or sadness and discomfort that are not easily noticeable to observers because the person actively hides them from other people (i.e., those feelings do not show on the “surface” of the person’s social behavior). This characteristic covaried with the stimulus person’s gender. Videotaped stimulus material was used. This material contained several episodes (relevant to university campus life) in

which, as subjects were told, actors were playing the roles of real people whose problems were known from extensive case studies.

### *Note About Pilot Studies*

The present experiment was the third in a series of studies designed to test the hypothesis that everyday, natural social interactions that subjects are involved in between two experimental sessions could functionally play the role of "ambiguous stimulus material," allowing for biased encoding and thus the self-perpetuating development of a bias. Two initial pilot studies followed the same general design and used the same instructions and very similar dependent measures. However, in the learning phase of those studies, subjects were exposed to short essays instead of videotaped episodes, and the contents of the essays were not as related to the reality of campus life as were the contents of the videotapes used in Experiment 3. Those two previous studies revealed consistent effects showing that subjects acquired an encoding bias due to the hidden covariations; however, no reliable increase of the bias between experimental sessions (attributable to the expected self-perpetuation process) was observed. One plausible explanation of this failure was the insufficient degree of similarity and relevance of the stimulus material presented in the learning phase with regard to the natural social experiences of subjects after the initial experimental session. To make the stimulus material more relevant, in the present experiment videotaped episodes were used that depicted people in the university campus environment (which was familiar to subjects).

### *Method*

#### *Overview*

In the learning phase of the experiment, subjects were exposed to a videotape showing six episodes, each less than 2 min long. The tape showed a stimulus person (one person in each episode) in various situations (e.g., standing in front of a mirror, walking across the campus, sitting alone in the cafeteria) thinking about some aspect of his or her life. The stimulus persons were not actually talking in the film, and vocal tracks were added after the taping of the visual part of the film, creating the familiar effect (from movies) of a person "thinking out loud."

There was a total of three men and three women in the film, and subjects were told that the scripts for the videotape were based on transcripts from extended interviews with real people, completed by graduate students in clinical psychology who supposedly were preparing in-depth case studies as part of their training. To make the material more homogeneous and the crucial covariation more hidden, in all six episodes the stimulus persons were said to be thinking about some problems or concerns relevant to self or the conditions of their lives. However, in half of the episodes the thoughts supposedly involved some kind of anxiety, sadness, or self-related discomfort that they hid from other people, and the fact that those feelings were hidden from other people was made clear in the script (e.g., "a person who appears to others as very sociable but in fact does not care about his social relations and feels very lonely"). The other half of the segments involved concerns that were much less serious and personal, pertained to external conditions rather than to self, were not hidden from other people, and involved not anxiety but rather a slight frustration with something outside the self (e.g., a teacher trying to find an excuse not to go to class or a person

irritated with the fact that a professor in his or her class ignores the existence of God).

The covariation manipulated in the material pertained to the relation between experiencing hidden sadness and gender. There were two experimental conditions. In one condition, all three male stimulus persons experienced the hidden sadness, and all three female stimulus persons did not (male sadness condition). In the other condition, all three female stimulus persons experienced the hidden sadness, and all three male stimulus persons did not (female sadness condition).

After viewing the videotape, subjects were asked to rate a number of male and female persons they knew on eight trait dimensions (six of which were related to sadness or the hiding of true feelings). Subjects were then asked for any comments or reflections they might have about the stimulus material and were thanked for their participation. The second experimental session was not announced; subjects were approached unexpectedly 2 weeks later and asked to participate in "a similar research project." The second session consisted only of filling out a rating form (similar to the one completed during the first session) and a postexperimental interview.

We expected that the ratings on dimensions related to sadness and the hiding of true feelings that subjects would assign to male and female persons would be biased in the direction consistent with the manipulation, and that this bias would increase between sessions, as predicted by the self-perpetuation hypothesis.

#### *Subjects*

Undergraduates (men and women) participated in the study for course credit. A total of 120 persons took part in the first session of the experiment, and 102 (85%) completed both sessions.

#### *Stimulus Materials*

The films presented to subjects in the two conditions differed with regard to the covariation between the genders of the actors and the contents of the episodes (i.e., the presence or absence of the crucial personality characteristic; see Overview). To reduce the possibility that some difficult-to-control idiosyncrasies would be introduced to the stimulus material, two different versions of the film for each experimental condition (male sadness and female sadness) were produced. The two versions followed the same general conventions and arrangement of the material regarding the manipulated relation between actors' genders and the contents of scripts (i.e., either hidden sadness or other thoughts); however, the two versions differed regarding the specific scripts and actors. There were two sets of six scripts (see Table 1). Each set consisted of three "hidden sadness" and three "other" episodes, and all scripts were written so that they could be played by either a male or female actor (i.e., the nature of the problems was not gender specific).

The actors who recorded the materials were six male and six female theater students from the University of Tulsa. The respective films in the two experimental conditions followed the same scripts and differed only in that either male or female actors played the roles of people experiencing the hidden sadness.

#### *Rating Forms*

The rating form was designed to measure the expected bias in subjects' person perception. The general design of the form was based on a form used in previous experiments that demonstrated its sensitivity to changes in subjects' person perception (Lewicki, 1983). Subjects rated 10 stimulus persons on eight 6-point trait dimensions (see Table 2).

Six of the eight dimensions were related to sadness or the hiding of true feelings (Dimensions 1, 3, 4, 6, 7, and 8), and the ratings on these

**Table 1**  
*Episodes Used in the Films: Experiment 3*

Episodes indicative of hidden sadness or anxiety

1. A person who appears to others as perfectly happy although in fact he or she is experiencing an unspecific and difficult-to-articulate for him- or herself feeling of loneliness and unhappiness
2. A person who forces him- or herself to show a facade of someone who enjoys interacting with others and tries actively to avoid the label *unsociable*, although in fact he or she does not care about social relations, is not comfortable with anyone, and at the same time is upset with his or her own conformism
3. A teacher feeling a hidden anxiety when he or she is teaching a class, but he or she does not show it to his or her students
4. A person who experiences anxiety when home alone, and this fact is hidden even from his or her roommate
5. A person experiencing strongly ambiguous feelings and anxiety toward God
6. A person experiencing hidden anxiety about his or her new date and the emotional commitment involved

Episodes not indicative of hidden anxiety and sadness

1. A person who first tried to convince him- or herself that he or she should take a nap and can afford it timewise, and eventually as a result of those reflections found that he or she was not sleepy anymore and became upset
2. A person upset with the low quality of food he or she just bought at the cafeteria and with the fact that he or she cannot afford better food
3. A teacher who is looking for an excuse for not going to class when the weather is nice
4. A person unhappy with the fact that his or her friends do not accept his or her new boyfriend or girlfriend
5. A person who is upset that his or her teacher ignores the existence of God
6. A person thinking about how to approach a friend and ask him or her for a date

dimensions were used as the main dependent measure of the study. Only one of these dimensions (Dimension 4; see Table 2) pertained explicitly to the hiding of true feelings; the others were related to sadness and dissatisfaction. This final selection of dimensions was based on the common notion that true satisfaction or dissatisfaction is what a person really feels deep inside rather than what a person chooses to show in public (on the surface). In other words, "real" satisfaction is not unambiguously observable in social interactions. We expected, therefore, that if a subject believes a target person is hiding his or her unhappiness and dissatisfaction, then the subject will think of (and rate) that target person not merely as hiding true feelings, but also as being generally unhappy and dissatisfied, regardless of the actual behavior displayed by the target.

Subjects were asked to rate real persons known to them (as defined by general role definitions; see Table 3). The layout of the rating form

**Table 2**  
*Dimensions of the Rating Form: Experiment 3*

1. Optimistic–pessimistic
2. Sexually attractive–not sexually attractive
3. Sad–happy
4. Does not hide true feelings–hides true feelings
5. Like me–not like me
6. Dissatisfied–satisfied
7. Not lonely–lonely
8. Low self-esteem–high self-esteem

**Table 3**  
*Definitions of Persons Who Were to Be Rated: Experiment 3*

1. Social self (you as other people know you)
2. Your same-sex best friend
3. Your boyfriend or girlfriend, or some actual person who could be your boyfriend or girlfriend
4. A female student whom you see on campus and whom you find particularly interesting
5. A male student with whom you interact frequently; the type of interaction is not important (it may be as simple as talking or watching TV)
6. A female student you have noticed who is particularly busy
7. A male student whom you see on campus and whom you find particularly interesting
8. A female student with whom you interact frequently; the type of interaction is not important (it may be as simple as talking or watching TV)
9. A male student you have noticed who is particularly busy
10. Real self (you as you really are)

was such that the dimensions were listed row-wise (i.e., one dimension per row) and persons to be rated were listed column-wise (i.e., one person per column). The completion of the rating form consisted of making 80 ratings (10 stimulus persons  $\times$  8 dimensions).

The first step in filling out the form was to select the respective persons to be rated. The experimenter read the role definitions consecutively (see Table 3) and allowed subjects about 30 s to decide on a real person who matched or best approximated the respective definition; subjects were asked to write down the respective person's name in a numbered box at the top of the appropriate column of the form.

When all stimulus persons were selected, subjects proceeded to rate them on each trait dimension of the form. Subjects were asked to work one row at a time and to start each row by assigning 1s and 6s to persons who possessed the extreme characteristics and 2s and 5s to those who clearly fell into one of the two halves of the dimension but did not possess extreme levels of the attribute. Ratings of 3 or 4 were to be assigned to those persons whom the subject perceived as being relatively ambiguous regarding the particular characteristic. There was no midpoint in the scale, and in cases in which a subject did not know how to rate a person on a given dimension (i.e., which rating to assign), the ratings 3 and 4 were to be assigned randomly. Completing the form took subjects about 30 min.

Subjects received carefully worded instructions designed to reduce the possible influence of social desirability on ratings. They filled out the rating forms anonymously (they were asked to sign the form using only a "code" or number of their choice). Subjects were also told that they would not be asked to return the part of the form containing the names of rated persons (scissors were provided to cut off the respective part of the form).

Two versions of the rating form were used. The versions were identical regarding the selection of the stimulus persons and dimensions. However, the order of stimulus persons and dimensions was different (Tables 2 and 3 show the order of items as used in Version 1 of the order form), and the endpoints of each dimension were reversed in Version 2; that is, the high ratings on each dimension in Version 1 corresponded to the low ratings in Version 2. The two versions of the form were introduced in order to reduce the potential influence of the arbitrary order of items on the dependent measures and also to reduce subjects' suspicions that the second session served only as a retest and that they were expected to provide the same responses as the first time. In the second experimental session, subjects were told that the form was similar to the first one, but not the same, and that they should not be concerned with being consis-

tent but simply try to be accurate in their ratings. Half of the subjects in each experimental condition filled out Version 1 during the first session and Version 2 during the second session; the other half filled out the forms in the reverse order. (The version of the rating form did not affect any dependent measures in this experiment, and thus this factor is not included in the data analysis.)

### Procedure

Subjects participated in the experiment in small groups (2–5 persons at a time). The experimenter introduced the film as “an exercise to get you in the mode of thinking about other people” and explained that the film was based on case studies of real people (see Overview). To avoid subjects’ suspecting that the film would be a part of a memory test or that there was something tricky in the material about which they would later be asked, the experimenter assured subjects that they would not be asked any questions concerning the film’s contents and asked subjects to relax and watch the film “as you would a TV show.” They were asked to think about the characters in the film as they were presented in the film and not to relate them to people or situations that they knew from their own experiences. The (female) experimenter who conducted the sessions was blind to the experimental condition (i.e., she was unaware of the order of tapes and questionnaires).

After watching the film, subjects were asked to fill out the questionnaire (i.e., the rating form) entitled “College Experience.” After completing this form, each subject was interviewed and asked for any comments or specific observations concerning the film or the questionnaire. Also, subjects were asked whether they would agree to be debriefed “at a later time when all data are collected and the project is finished”; all subjects agreed. Subjects were then thanked for their participation and did not expect any additional experimental sessions.

About 2 weeks after the first session, subjects were contacted (by phone) and asked whether they could take part in another similar (but shorter) project. At the beginning of the session, subjects were asked to write down the names of stimulus persons (in the numbered boxes at the top of the appropriate columns of the form) following the definitions read by the experimenter. Subjects were told that most of the definitions would be the same as before (in fact, all of them were identical) and were asked to try to remember the choices they had made the last time they filled out the forms and to use the same names as before. When the name boxes were filled in, subjects were asked to rate the stimulus persons on all dimensions as they had before. Before completing the form, the experimenter assured subjects that the purpose of the second session was *not* to test for the time stability of their responses (see first paragraph of this section).

After filling out the form, each subject was interviewed. As after the first experimental session, the experimenter asked the subjects for any comments or specific observations that they had about the film and the questionnaire. None of the subjects interviewed after either the first or the second experimental session mentioned anything that was even close to the actual nature of the manipulation or the relation between the film and the rating forms. Also, none of the subjects mentioned anything that would suggest that they did not trust the experimenter’s explanation of the role of the film in this experiment. The film impressed subjects as being very “psychological” and thus appropriate for a psychology study; some subjects interviewed after the first session mentioned that the film actually did “get them in the mode of thinking about other people.” After completion of the entire study, all subjects were contacted again by the experimenter and were fully debriefed about the true purpose of the experiment. In particular, it was stressed that there is no relation between hidden sadness and gender.

### Dependent Measures

The main dependent measure (rating of sadness) was the average rating on dimensions related to unhappiness or the hiding of true feelings (see Table 2, Dimensions 1, 3, 4, 6, 7, and 8) that subjects assigned to male and female stimulus persons in the first and second rating form. Before computing the means, the scales were transposed so that high ratings always indicated more sadness or hiding of true feelings. The index for men was based on ratings of Stimulus Persons 5, 7, and 9; the index for women was based on ratings for Stimulus Persons 4, 6, and 8 (see Table 3). Social self, same-sex best friend, boyfriend or girlfriend, and real self (Stimulus Persons 1, 2, 3, and 10; Table 3) were excluded from the calculation of the main indexes, because those ratings were expected to be more stable and less open to biases caused by the manipulation. However, the ratings for the two irrelevant dimensions (2 and 5) and the four excluded stimulus persons (1, 2, 3, and 10) were analyzed separately to check for the specificity of the manipulation.

### Results

Figure 7 shows the mean ratings of sadness assigned to male and female stimulus persons, separately for the male sadness and female sadness conditions.

Consistent with the direction of the covariation manipulated in the learning phase of the experiment, the pattern of mean ratings indicates that subjects in the male sadness condition rated male stimulus persons as more sad and female stimulus persons as less sad than did subjects in the female sadness condition. Figure 8 shows the mean ratings separately for each experimental session.

The pattern of ratings indicates that, consistent with the self-perpetuation hypothesis, the effects of the manipulation were stronger in Session 2 as compared with Session 1. In the second experimental session, subjects in the male sadness condition rated the male stimulus persons as more sad and the female stimulus persons as less sad; this pattern of results was reversed in the female sadness condition.

The data were analyzed in a  $2 \times 2 \times 2 \times 2$  ANOVA (Experimental Condition: Male vs. Female Sadness  $\times$  Subjects’ Gender  $\times$  Stimulus Persons’ Gender  $\times$  Session: First vs. Second) with repeated measures on the last two variables. There was an interaction between experimental condition and stimulus persons’ gender,  $F(1, 98) = 3.70$ ,  $MS_e = 2.13$ ,  $p < .05$ , indicating that the overall effect of learning (suggested by the mean ratings collapsed across the sessions; see Figure 7) is reliable. There was also a three-way interaction between experimental condition, stimulus persons’ gender, and session,  $F(1, 98) = 6.49$ ,  $MS_e = 1.009$ ,  $p < .01$ , indicating that the mediating effect of experimental session predicted by the self-perpetuation hypothesis (see Figure 8) is reliable. This was further confirmed by a series of planned comparisons (contrasts). There was a significant partial interaction between the stimulus persons’ gender and session in the male sadness condition,  $F(1, 98) = 3.94$ ,  $MS_e = 0.614$ ,  $p < .05$ , and a marginal analogous interaction in the female sadness condition,  $F(1, 98) = 2.61$ ,  $MS_e = 0.406$ ,  $p < .10$ . There were no effects involving subjects’ gender and no other reliable main effects or interactions.

The pattern of mean ratings on the two irrelevant dimensions did not show any systematic effects of the manipulation. The analogous analyses of variance performed on indexes based on

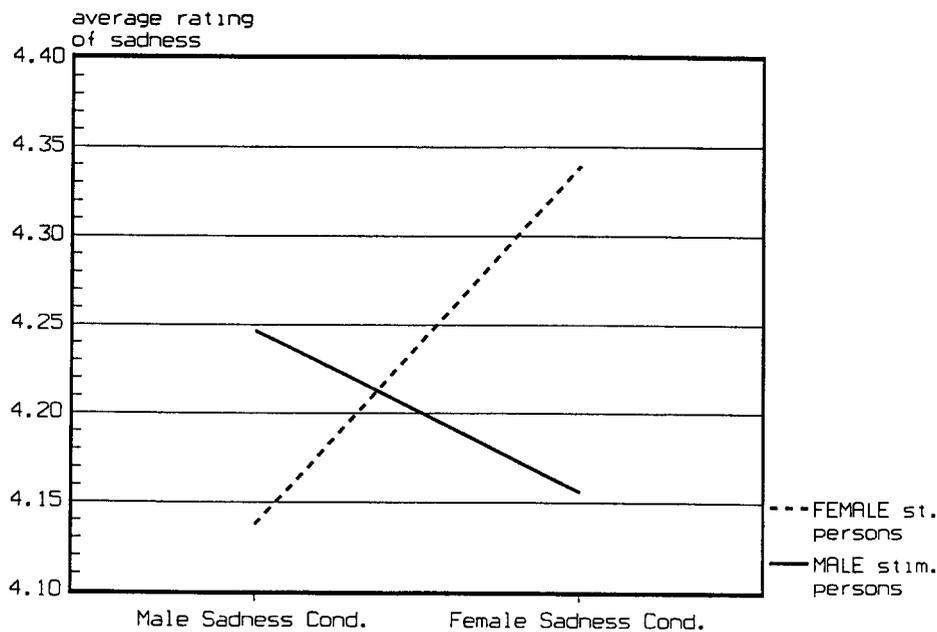


Figure 7. Average ratings of sadness of male and female stimulus persons by experimental condition (male sadness vs. female sadness): Experiment 3. (Cond. = condition, st. or stim. = stimulus.)

only these two irrelevant dimensions did not reveal any reliable effects (all  $p$ s > .20). The comparison between this analysis based on only the two dimensions and the previously reported analysis based on the six dimensions is biased in favor of the latter (because it is based on more reliable measures). However, when the ratings from the irrelevant dimensions were included in the computation of the overall indexes, then the sizes of all of the previously reported effects decreased. This additionally argues against the consistency of ratings on the irrelevant dimensions with the predicted pattern of changes caused by the manipulation and argues for the specificity of the effects obtained in this study. This conclusion received additional indirect support from a series of exploratory analyses that were performed on the ratings assigned to the four stimulus persons excluded from the analysis (real self, social self, best friend, and boyfriend or girlfriend) and that did not yield any reliable effects of the manipulation.

Situations in which subjects are asked to make their judgments for the second time are open to polarization effects (Tesser, 1978). Namely, after having an opportunity to think about the previously judged issues, subjects' attitudes tend to become more extreme. However, the polarization effect cannot explain the pattern of findings from the present experiment, because in this study only half of the ratings became more extreme; moreover, it was a different and a predictably different half in each of the two experimental conditions (see Figure 8).

### Discussion

The design of Experiment 3 did not allow for experimental control at the level comparable to that possible in Experiments 1 and 2. The nature of subjects' experiences between the experi-

mental sessions could not be controlled, and thus it is uncertain as to what extent those experiences followed the pattern assumed in the model of the self-perpetuation process. It is possible that in between sessions subjects selectively sought out or remembered social information consistent with the experimental manipulation. Also, as the names of stimulus persons were confidential, it was impossible to ascertain whether the same persons were rated in the first and second form; thus, it cannot be ruled out that the results may have been due to a different and systematically biased selection of stimulus persons in the second rating form (although this would assume an increase of a specific bias in the selection of stimulus persons, and thus is not completely inconsistent with the hypothesized self-perpetuation process).

Another process that could be considered a possible mediator of the observed increase in consistency of subjects' ratings with the manipulated covariation is assimilation over time to an initial impression stored in memory. Srull and Wyer (1980) demonstrated that the influence of a primed category on the formation of an impression of a stimulus person described in ambiguous terms (with respect to the primed concept) intensifies over time. Their explanation for this phenomenon is that over time subjects forget the specifics of the priming and remember only pure and more extreme encoding. Although the possible contribution of such a process to the results observed in the present experiment cannot be entirely ruled out, there are important differences between the previous data on this assimilation process and the current experiment. Namely, the assimilation data pertain to a single category (that was primed) and not to a covariation between two categories (such as that manipulated in the present experiment); also, no effects similar to those ob-

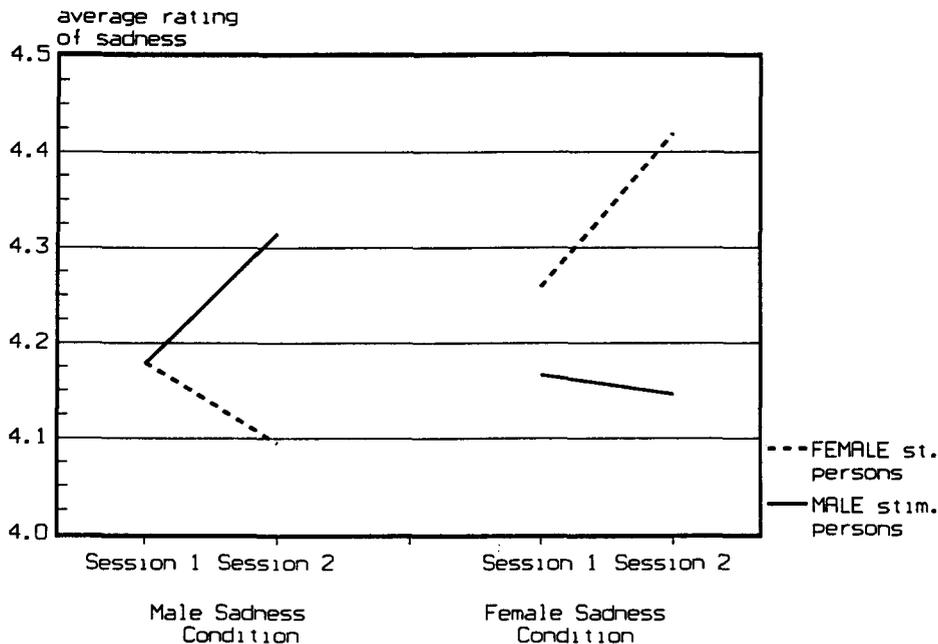


Figure 8. Average ratings of sadness of male and female stimulus persons by experimental condition (male sadness vs. female sadness) and experimental session (Session 1 vs. Session 2): Experiment 3. (St. or stim. = stimulus.)

tained by Srull and Wyer were found in previous research on the processing of information about covariations in which the testing phases were delayed (Lewicki, 1986a).

We should note that the pattern of results obtained in this study is very systematic across not only the experimental conditions, but also the two parts of the stimulus material (i.e., male and female stimulus persons), and it is perfectly consistent with the predictions of the self-perpetuation hypothesis.

The major advantage of using this seminatural manipulation is the relatively higher (as compared with true laboratory studies) external validity of the experimental paradigm. The data suggest that the observed increase of the specific bias, which was found to be predictably different in the two experimental conditions, was "fueled" by the same natural social experiences encountered by the subjects between sessions. Obviously, it does not seem reasonable to suspect that after the first session, subjects incidentally happened to be exposed to experiences objectively consistent with the manipulation from their respective experimental conditions. Therefore, one can conclude that a perceptual (encoding) bias, like the one initiated in Experiment 3 by the very limited number of consistent instances, does not decay when subsequent supportive evidence is lacking, but instead shows a tendency to strengthen over time. Because the social reality encountered by the subjects in natural conditions can be thought of as particularly ambiguous regarding the specific feature that was manipulated in Experiment 3 (i.e., sadness or discomfort actively hidden from other people) and thus is open to alternative interpretations, the self-perpetuation hypothesis appears to be a viable explanation for the increase of the encoding bias observed in this study.

## Conclusions

The results of the three experiments presented here are consistent with the hypothesized self-perpetuation mechanism involved in the development of encoding biases. The data suggest that an encoding rule may (unconsciously) lead to the interpretation of ambiguous stimuli as being consistent with the preexisting disposition; this subjective perception of reality may result in the gradual strengthening of the rule, much in the same way as if actual supportive evidence had been encountered.

Experiments 1 and 2 demonstrated the laboratory simulation of a process that can mediate the interpretation of stimuli in real-life conditions whenever the stimuli are ambiguous and thus open to alternative interpretations. The consistent results of Experiment 3, which used a seminatural manipulation, support this possibility.

The initial experiences capable of triggering such a self-perpetuating development of a bias (and starting the "snowball") may in real life be conditions that are very difficult to identify because they may be incidental, nonsalient, and even not consciously remembered as meaningful events by a perceiver. Recent research has demonstrated that surprisingly little consistent evidence is sufficient to produce an initial encoding bias (Lewicki, 1986b), and in some circumstances even a single instance may be sufficient (Lewicki, 1985).

It is reasonable to assume that the nonconscious character of most encoding processes constitutes an important factor stimulating the self-perpetuation of biases. The self-perpetuation process discussed here clearly represents an unjustified distortion of reality and a distortion that affects one's general knowledge

structures. Thus, one can suppose that if the perceiver had any control over it, he or she would stop it immediately, or if the perceiver at least knew about the distortion, he or she would block or counteract its development via conscious control processes.

An additional important consequence of the nonconscious character of self-perpetuation is its potential independence from consciously controlled knowledge structures, thus allowing for the development of biases that are inconsistent with perceivers' consciously held beliefs. Examples of such discrepancies between consciously held knowledge and uncontrolled encoding of stimuli (and emotional reactions triggered by such encoding) have been discussed elsewhere (Lewicki, 1986a; Lewicki & Hill, 1987). For example, most patients who suffer from minor neurotic symptoms or phobias (e.g., an anxiety about being home alone or a fear of white, downy objects) have no problem admitting that their feelings and reactions toward the sources of the fear are unreasonable, and they agree that objectively those objects do not involve any threat whatsoever (Barratt, 1984). Nevertheless, they usually can neither modify their "involuntary" categorizations when they encounter those objects nor say where their dispositions to nonconsciously encode "threat" in such an unreasonable manner came from.

This kind of clear independence or inconsistency between, on the one hand, the nonconsciously operating encoding processes and, on the other hand, perceivers' consciously controlled knowledge and preferences is by no means confined to psychological disorders (Lewicki, 1986a). This independence (and the potential discrepancy) can be found in every individual and can be observed very often in everyday life. For example, some social stimuli are automatically categorized as emotionally moving, and despite the fact that this may be inconsistent with what the person thinks on the consciously controlled level, the encoding processes responsible for generating those categorizations may automatically trigger respective behavioral reactions (e.g., feeling touched, tears). People usually cannot control these kinds of feelings. Sometimes they are even surprised and wonder why they have responded this way, because they consciously classify the situation as unrealistic, naive, or melodramatic. For example, when watching movies like *Love Story* or *Lassie Come Home*, people often recognize a primitive manipulation designed to affect viewers' feelings, but still feel touched and cannot stop their tears.

The question arises as to the limits of the phenomena investigated in these experiments. Can something be subject to nonconscious processing in terms of covariations and be reinforced indefinitely via self-perpetuation processes? First, it is reasonable to expect that nonconscious processing of information about covariations is at least to some extent selective. For example, previous research indicates that subjects' stable dispositions (such as the permanent accessibility of the category of threat; Lewicki, 1986a, Experiments 4.9 and 8.1) specifically influence subjects' nonconscious sensitivity to covariations that involve features relevant to the dispositions. In a recent study, the nonconscious acquisition of information about the manipulated covariation between the gender of a stimulus person and some nonsalient characteristics of its silhouette was found only in subjects with strong gender identity as measured by the Bem

Sex-Role Inventory (Hill & Lewicki, 1988). Thus, processing information about covariations is likely to be not indiscriminant. Theoretically, a nonconsciously acquired encoding bias could be "indefinitely" strengthened by ambiguous evidence (and it is possible that this is what happens in the development of some neurotic and other dysfunctional biases, e.g., phobias). However, because of the statistical nature of reality, it is reasonable to assume that most of such "snowball" processes are stopped or reversed by unambiguous evidence encountered by the perceiver, thus terminating the self-perpetuation process before strong biases develop.

In summary, three different experimental paradigms were used in the research reported here, and each of them produced consistent results. This argues against the possibility that some response set or some other idiosyncratic characteristic of a particular experimental paradigm or stimulus material may have been responsible for the pattern of data obtained. Moreover, the diversity of stimulus materials and subjects' tasks used in this series of experiments additionally supports the hypothesis that the phenomenon of self-perpetuation is general, and that it can influence the process of acquisition of encoding rules in various areas of human cognition. Additional evidence for the self-perpetuation process has recently been obtained in another series of studies with three different types of nonsocial stimulus materials (Lewicki, Hill, & Sasaki, in press). Because encoding rules imply the basic interpretive categories that individuals use, and because those categories are often acquired outside the individual's conscious awareness (Lewicki, 1986a; Lewicki & Hill, 1987; Lewicki et al., 1988)—for example, via processes of incidental or implicit learning (Fried & Holyoak, 1984; Reber, 1976, 1989; Reber & Allen, 1978)—the self-perpetuation process may contribute to the development of various aspects of human personality (e.g., social preferences, stereotypes, esthetic preferences, biases) and general adjustment.

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