Processing Strategy Moderates
the Cultivation Effect

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This study tested the hypothesis that processing strategy moderates the effect of television viewing on social perceptions (cultivation effect). One hundred twenty-two male and female students provided estimates of the prevalence of crime, occupations, affluence, and marital discord under one of three conditions. Some participants were induced to process heuristically (heuristic group) through instructions to provide their estimates spontaneously with little elaboration. Other participants were induced to process systematically (systematic group) through an accuracy motivation/task importance manipulation. A third (control) group received instructions to simply answer the questions. The results indicated that processing strategy moderated the cultivation effect such that cultivation effects were noted in the heuristic and control groups but not in the systematic group. These results are consistent with the notion that the cultivation effect can be explained in part as the result of heuristic processing through lack of source discounting, and they provide support for the heuristic processing model of cultivation effects.

The notion that the viewing of television program content is related to people’s perceptions of social reality is virtually undisputed in the social sciences. What is disputed is the nature of this relation. For example, Gerbner and colleagues have suggested that television viewing has a causal influence on social judgments (for reviews, see Gerbner, Gross, Morgan, & Signorielli, 1994; Morgan & Shanahan, 1996). They have coined the term cultivation effect to describe this phe-

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nomenon, which is typically demonstrated by a positive correlation between the amount of television a person watches and the extent to which that person’s real-world perceptions are congruent with the world as it is portrayed on television. Other researchers, however, have suggested that this relationship between viewing and social perceptions is either spurious (Doob & Macdonald, 1979; Hirsch, 1980; Hughes, 1980) or in a causal direction that is the reverse of that implied by cultivation theory (Zillmann, 1980).

To date, the preponderance of research investigating the validity of the cultivation effect has taken two basic paths: extending the content domains to which the effect may apply (e.g., crime, violence, affluence, marital discord, occupational prevalence) or investigating issues of spuriousness by the identification of variables whose inclusion in the analysis renders the cultivation effect nonsignificant (e.g., direct experience, demographics, personality variables).

This study takes a different perspective by addressing the cognitive processes that may potentially be involved in producing the cultivation effect. This approach has several advantages. First, it has the potential to provide greater validation for the effect. As Hawkins and Pingree (1990) note, if a mental process model that accounts for the cultivation effect can be constructed and validated, it adds to the preponderance of evidence that supports the general theory and “the field can have much more confidence in what the correlational results tell us” (p. 36). In particular, a cognitive process model would attempt to establish clear links between the stimulus (television) and judgment (beliefs). If each link in the model can help establish a solid theoretical foundation and provide empirical verification, threats to internal validity such as spuriousness and reverse causality become less plausible (i.e., spuriousness and/or reverse causality would have to occur at each stage).

A second advantage of the cognitive processing approach is that it has the potential to provide for a more complete understanding of how the effect works. Without the construction and testing of a process model, researchers can only speculate as to how television exerts its influence on individuals (Comstock, Chaffee, Katzman, McCombs, & Roberts, 1978).

A third advantage of the cognitive processing approach is that through an understanding of how the effect works, avenues for controlling the effect may be uncovered. That is, if an effect can be understood in terms of steps within a process, then interventions may be developed that are designed either to interrupt or facilitate the process at critical points, depending on whether the effects in question are considered detrimental or desirable.
COGNITIVE PROCESSING AND CULTIVATION JUDGMENTS

The cognitive processing approach departs from most media effects studies in that it focuses first on the judgments (i.e., the dependent variables) and how such judgments are constructed in general. This process entails understanding how different conditions influence the judgment construction process. Once these processes are delineated, propositions can then be constructed to account for how particular media content (i.e., the independent variable) influence the judgments.

Assumptions of the Model

The model to be presented is predicated on a number of assumptions, some of which are definitional and some of which are conceptual. The first assumption, a definitional one, is that a cultivation effect refers merely to a positive relation between the amount of television a person watches and the degree to which the person’s judgments about social reality reflect a television-world point-of-view. For the purposes of the model, interest is only in the accumulation of television information, not in how the information was accumulated (i.e., viewing motives, habitual vs. selective viewing, etc.).

A second assumption of the model is that a cultivation effect occurs at the time of judgment. That is, the effect occurs at the time of information integration (i.e., when television information is actually integrated into beliefs) rather than at the time of information encoding (i.e., when television information is merely recorded into memory during viewing). Thus, the model is concerned only with the output of the cultivation process and is mute with respect to any other aspects of the cultivation model. Based on this definition, a cultivation effect would be noted if a person watches a violent program, and in the process of viewing forms the impression that the world is a mean and violent place. In this case, encoding and judgment occur very close together, and the judgment is based on material just presented (called an on-line judgment, Hastie & Park, 1986; see also Notes 1 and 2 of this article). Alternatively, another person may not spontaneously form this impression, but simply stores the various pieces of information in memory. Later, however, the person may be asked by someone such as a pollster, a friend, or maybe even an academic researcher to provide a judgment on the incidence of crime. At this point, the television information may be recalled and used to formulate the judgment. If so, a cultivation effect occurs at this time.

A third assumption of the model, and its basic underlying tenet, is that cultivation effects can be understood in terms of the mental processing
strategies that people use in constructing cultivation judgments (i.e., those judgments typically used as dependent measures in testing for a cultivation effect). In particular, the model suggests that cultivation effects are the result of heuristic processing. Heuristic processing refers to a limited mode of processing that requires little effort and uses few cognitive resources (Chaiken, 1987). Rather than making an effortful, exhaustive search of memory for information pertaining to a particular judgment (systematic processing), people who use a heuristic processing strategy tend to focus on information that allows them to invoke simple decision rules (heuristics).1 Common examples of such heuristics are “experts can be trusted,” “attractive people are sociable,” and so forth (Eagly & Chaiken, 1993). Because heuristics are easy to apply and make few demands on cognitive resources, they tend to be used in instances in which either the ability to process information is impaired (e.g., time pressure, distraction) or the motivation to process information is low (e.g., low involvement). Consequently, heuristics are typically used to simplify difficult judgments (Sherman & Corty, 1984).

In the context of the types of judgments typically used in cultivation studies, one particular heuristic that may be employed is the availability heuristic (Tversky & Kahneman, 1973).2 This heuristic posits that people infer the prevalence of a construct from the ease with which an example is retrieved. That is, they infer that because something is easy to remember, it must have occurred frequently (Sherman & Corty, 1984; Wyer & Srull, 1989). The ease of retrieval is typically referred to as accessibility.3 For example, suppose a person is asked to provide an estimate of the prevalence of violent crime in the United States (i.e., the percentage of Americans who are victims of a violent crime). The availability heuristic suggests that the person would attempt to generate an example of violent crime in the U.S. and then estimate its prevalence based on how easy it was for the person to recall the example: The easier it was to recall, the higher the estimate. Note, however, that this process likely occurs relatively automatically, with little or no conscious motivation to apply such a heuristic (Bargh & Chartrand, 1999; Gabrielcik & Fazio, 1984).

Heuristic Processing Model of Cultivation Effects

The concept of heuristic processing and the application of the availability heuristic are the bases for the general model to be described, referred to as the heuristic processing model of cultivation effects (Shrum, 1997, 1999c; Shrum, Wyer, & O'Guinn, 1998). The model specifies a series of testable propositions that have implications for how television information may be used in the judgment-construction process.
Proposition 1: Television viewing influences accessibility. The role that level of television viewing may play in the construction of real-world judgments is through its effect on the accessibility of information from memory (Shrum, 1995). Research has shown that several factors may affect the accessibility of particular information (for a review, see Higgins & King, 1981). The factors most relevant to television viewing include both the frequency and recency of activation of a construct (Wyer & Srull, 1989), vividness (Reyes, Thompson, & Bower, 1980), and distinctiveness (Higgins & King, 1981). Because particular constructs have been shown to be overrepresented on television relative to their real world representation (e.g., crime and violence, particular occupations, marital discord, affluence; see Gerbner, Gross, Morgan, & Signorielli, 1980; Lichter, Lichter, & Rothman, 1994; O’Guinn & Shrum, 1997), heavy viewers should have activated and stored these constructs more frequently and recently than light viewers. Moreover, the television information that is stored may also be quite vivid and distinctive, further enhancing its accessibility for heavy viewers.

If constructs frequently portrayed on television are indeed more accessible for heavy viewers than for light viewers, and people use the availability heuristic in constructing estimates of the prevalence of these constructs, then heavy viewers should give higher estimates than light viewers (a cultivation effect). Several studies have provided support for this process. Shrum and O’Guinn (1993) found that not only did heavy viewers give higher first-order estimates than light viewers, they also constructed their judgments faster, suggesting that information was more accessible from memory for the heavy viewers. These results have been replicated for a variety of dependent variables, different operationalizations of television viewing, and multiple control variables (cf. O’Guinn & Shrum, 1997; Shrum, 1996; Shrum, O’Guinn, Seminik, & Faber, 1991).

Proposition 2: Accessibility mediates the cultivation effect. The most stringent test of the availability heuristic should show that the bias in accessibility created by the independent variable mediates the relation between the independent variable and the dependent measure (Manis, Shedler, Jonides, & Nelson, 1993). Thus, accessibility (inferred from speed of response) should mediate the cultivation effect. Shrum and O’Guinn (1993) provided partial evidence of such mediation by showing that when speed of response was statistically controlled, the cultivation effect was reduced to nonsignificance. Shrum (1996) provided a more stringent test by showing via path analysis that level of television viewing influenced speed of response, which in turn, influenced the magnitude of the estimates, and these relations held in the presence of the direct relation between viewing and the estimates.
Proposition 3: Television exemplars are not discounted. An assumption implicit in the heuristic processing model is that the television-related exemplars retrieved in the process of constructing cultivation judgments will be considered relevant and therefore used as a basis for the judgment (Herr, 1986; Higgins & Brendl, 1995; Higgins, Rholes, & Jones, 1977). This assumption is worth noting because it is not necessarily intuitive. The availability heuristic suggests that when people are attempting to construct estimates of, say, the percentage of the work force that consists of lawyers, they will recall an example of a lawyer and infer the incidence of lawyers from the ease with which the example is recalled. The availability bias created by television viewing implies that heavy viewers will have more lawyer examples stored in memory. However, these examples will be “television examples,” and it is reasonable to question whether people will consider these examples to be useful in constructing real-world judgments. If they do not, alternative information would be retrieved and used in the judgment process (Shapiro & Lang, 1991).

One way in which television information may be used for constructing real-world judgments, even if people do not think the information is veridical or useful, is if people are unaware of the source of the examples they retrieve and thus do not source discount (Shapiro & Lang, 1991; Slater, 1990). Such lack of awareness of source characteristics may occur if source characteristics are not sufficiently considered when making the judgments. This process would be consistent with the low-involvement nature of heuristic processing. Source characteristics of the exemplars may over time become more difficult to retrieve than the exemplars themselves, as the sleeper effect suggests (see Pratkanis, Greenwald, Leippe, & Baumgardner, 1988). Thus, determining source characteristics should require additional effort on the part of the participant and this effort is more likely to be made under high- rather than low-involvement conditions. However, it is likely that the actual task of answering typical cultivation questions is a low-involvement one. Cultivation studies are usually conducted using survey instruments; people (either students or people in the general population) may be in a hurry to get the survey completed and likely find the questions difficult. Just as important, there is no sanction for wrong or inaccurate answers. The answers to the survey questions are invariably anonymous, so there are no incentives, either intrinsic or extrinsic, for giving a well thought-out response. All of these conditions could contribute to the likelihood that a heuristic processing strategy would be adopted.

Indirect evidence that television information is not discounted but indeed is used as a basis for judgment is provided by the reaction-time studies described previously. If television information is discounted and other examples retrieved, heavy viewers should take longer to construct
their estimates than light viewers because of greater discounting. However, just the opposite was found. A more direct test of discounting was provided in two experiments by Shrum et al. (1998). In those experiments, participants received a source prime (i.e., source [television] characteristics were made salient) prior to providing their cultivation judgments. Participants were expected to be more likely to source discount—and thus reduce the effect of television information—under priming conditions than under no-priming conditions. As hypothesized, a cultivation effect was observed in the no-priming condition, but not in either of the priming conditions. These results, combined with the results indicating that most people do not believe that television portrayals accurately reflect reality (Shrum, 1995), suggest that people likely are not considering the source of the exemplars they generate in the course of constructing cultivation judgments.4

Extending the Model

One problem that is characteristic of both the reaction-time studies and the source-priming studies just discussed is that the evidence supporting the proposed cognitive mechanisms is contingent upon the validity of several operationalizations of both the dependent and independent variables. For one, the evidence supporting heuristic processing depends on the validity of the use of reaction time to infer accessibility. Although a number of control variables were included to directly address this issue (e.g., impulsivity, need for cognition, baseline latencies), it is still possible that heavy viewers provide faster answers than light viewers for reasons other than the accessibility of the exemplars. In addition, inferences regarding cognitive processes derived from the source-priming studies depend on the validity of the source-priming manipulation. That is, did the elimination of the cultivation effect in the priming conditions occur because of actual source discounting or was the elimination attributable to some other mechanism induced by the manipulation?

The study to be reported here takes a more direct route in investigating these cognitive processes in order to address some of these issues and provides further tests of the heuristic processing model of cultivation effects. Specifically, the study tests a fourth proposition of the model.

**Proposition 4: Systematic processing reduces or eliminates the cultivation effect.** The method for testing this proposition involves manipulating the types of strategies that respondents use in constructing cultivation judgments in order to infer more directly the types of cognitive processing in which people are engaging. Some participants were induced to process
heuristically (*heuristic condition*), others were induced to process systematically (*systematic condition*), and a third group received no manipulation (*control condition*).

The reasoning behind this type of design is straightforward. The premise of the heuristic processing model of cultivation effects is that people generally engage in heuristic processing when constructing cultivation judgments. If this is the case, then inducing people to process heuristically should have no effect relative to a control group whose processing strategy is not manipulated. However, suppose participants are induced to process systematically. Systematic processing, which typically occurs in high involvement situations, is characterized by more careful and extended consideration of information prior to rendering a judgment. This type of processing is useful for determining the validity of information (Petty & Cacioppo, 1986) and has been shown to attenuate the effects of heuristics (Chaiken & Eagly, 1983). Under systematic conditions, it seems likely that the effects of television information will be weakened and possibly eliminated when participants construct their judgments. Participants in systematic conditions should be more likely to consider the source of the information they retrieve, more likely to discount television information, and more likely to consider and use information from sources other than television, compared to participants in the other conditions. If so, television information (and thus, level of television viewing) should have less of an effect under systematic processing conditions than under either of the other two processing conditions.

Summarizing, a cultivation effect is expected when participants process heuristically. Because the model presumes that heuristic processing is the normal mode of processing in the construction of cultivation judgments, a cultivation effect is expected when people provide their judgments under simple instructions to answer the survey questions (control condition) or when they provide their judgments after they are induced to process heuristically (*heuristic condition*). However, no cultivation effect is expected when participants are induced to process systematically (*systematic condition*).

### METHOD

**Sample and Procedure**

One hundred twenty-two undergraduates (59 men and 62 women) from an introductory business course at Rutgers University participated in small groups in exchange for partial course credit. Each person received two study booklets in a packet. In the first booklet, participants provided their
consent to participate as well as their answers to the dependent measures, after which they completed the items that served as manipulation checks. In the second booklet, participants provided information regarding their television viewing habits and other supplementary measures. The manipulation check data were collected prior to the remaining data in order to obtain an assessment of task involvement before participants’ memories of the task faded. The dependent measures were collected prior to the television viewing information to avoid priming (Shrum et al., 1998) or otherwise contaminating participants’ judgments by making television viewing salient (Morgan & Shanahan, 1996). Participants were told that the two booklets represented separate studies for two different professors at the university, and research assistants who helped monitor the study confirmed that the booklets were completed in the proper order and that no participant went back to the first booklet after starting the second one. All of the participants were debriefed after the study.

Processing manipulation. Participants were randomly assigned to one of three experimental conditions. The processing manipulation involved the manipulation of instructions prior to completing the dependent measures. In the control condition, the questionnaire that participants received simply gave them instructions to answer the questions that followed. In the heuristic condition, the questionnaire’s instructions told participants that the researchers were interested in the participants’ “spontaneous” reactions to the questions that followed, and instructed them to read each question and “give the first answer that occurs to you, . . . off the top of your head.” In the systematic condition, participants were induced to process systematically using an accuracy motivation/task importance manipulation (Chaiken, 1980; Chaiken & Maheswaran, 1994; Maheswaran & Chaiken, 1991; Thompson, Roman, Moskowitz, Chaiken, & Bargh, 1994). High task importance and motivation to be accurate have been shown to be associated with systematic processing (Chaiken, Liberman, & Eagly, 1989; Kruglanski, 1990; Tetlock, 1983). The manipulation consisted of providing participants with questionnaires that instructed them to be as accurate as possible with their answers, that after they completed the questionnaire the experimenter would “grade” their answers, and that the experimenter would discuss their answers with them and expect them to justify their answers. Participants were also told that the experimenter would indicate to them whether they performed better or worse than the average student in terms of accuracy.

Dependent measures. The dependent measures were comprised of 40 items (henceforth, “social reality estimates”) used in previous studies (e.g., Doob & Macdonald, 1979; Gerbner, Gross, Jackson-Beeck, Jeffries-Fox, &
Signorielli, 1978; Hawkins, Pingree, & Adler, 1987; O’Guinn & Shrum, 1997; Shapiro, 1991; Shrum, 1996). Of these items, 25 concerned beliefs about the incidence of crime (e.g., the percentage of women who are raped, the percentage of people who will be victims of a gun shot, the percentage of Americans who have been victims of a violent crime; $\alpha = .86$), 5 concerned the prevalence of particular occupations (e.g., the percentage of work force that are lawyers, doctors; $\alpha = .79$), 7 pertained to beliefs about the prevalence of products and behaviors associated with affluence (e.g., the percentage of Americans who have a private tennis court, swimming pool, belong to a country club; $\alpha = .73$), and 3 pertained to beliefs about the prevalence of marital discord (e.g., the percentage of Americans who get divorced, have an extramarital affair; $\alpha = .56$). Participants’ answers to the items representing each construct were averaged to form a composite index (for the crime measures, the response format varied over items; thus, $z$-scores were computed prior to averaging). As with most studies testing for cultivation effects, the social reality measures pertained to constructs that appear on television to a greater degree than they appear in real life (Gerbner et al., 1994; Lichter et al., 1994; O’Guinn & Shrum, 1997; Shrum, 1996).

**Television measures.** Television viewing was assessed in two ways. Participants first estimated the number of hours they watch television in a typical week, within four specific day parts: morning (6 a.m. to noon), afternoon (noon to 7 p.m.), evening (7 p.m. to 11 p.m.), and night (11 p.m. to 6 a.m.). They also estimated how much television they watch on a typical Saturday and a typical Sunday. These estimates were summed to give a measure of total weekly viewing. A second measure of viewing was obtained by asking participants to estimate their typical weekly viewing for each of 10 program categories: daytime soap operas, news, sports, movies, comedies, dramas, music, talk shows (day), talk shows (night), and game shows. A weekly measure of television viewing was obtained by summing the hours reported within each program category. The two weekly television measures were considered to be sufficiently correlated ($r = .58$) to permit them to be averaged to form a single weekly television viewing measure.

**Supplementary data.** Based on previous research, data pertaining to general demographic factors that might relate to either the independent or dependent variables were collected. These data included participants’ sex, family income, age, and grade point average (GPA). It is possible that sex may be related to the accessibility of particular types of information (e.g., certain types of crime or violence, such as rape). In a similar manner, level of family income may be related to perceptions of affluence, and income
has also been shown to be related to television viewing level (O’Guinn & Shrum, 1997). Age was measured because it may relate not only to television viewing level (Hughes, 1980) but to accumulated television memories over time, and GPA was measured because it may relate to intelligence and therefore to the accuracy of the participants’ answers to the dependent measures. In addition, need for cognition was assessed using Cacioppo and Petty’s (1982) scale. This 18-item scale measures the extent to which people enjoy engaging in effortful cognitive activity, and need for cognition has been shown to relate to the use of particular processing strategies (people who are lower in need for cognition tend to favor heuristic processing, whereas people who are higher in need for cognition tend to favor systematic processing; see Haughtvedt & Petty, 1992; Haughtvedt, Petty, & Cacioppo, 1992). These variables were used as control variables in the data analysis.

**Manipulation checks.** Two items served as manipulation checks and were measured immediately after the dependent variables but prior to the television viewing and supplementary data. The first item asked respondents to indicate their level of task involvement on a 7-point scale, anchored by *not at all involved* and *very involved*. The second item asked participants to indicate their level of agreement with the statement “It was important to me that I get the right answer” and was measured on a 7-point Likert scale. Finally, the time each participant took to complete the first survey was measured as a third manipulation check.

**RESULTS**

**Manipulation Checks**

Analysis of the manipulation check items indicated that the manipulation was successful. The systematic group reported more involvement with the task \((M = 5.33)\) than did either the control group \((M = 4.62), t(80) = 2.70, p < .01,\) or the heuristic group \((M = 4.58), t(78) = 2.97, p < .01.\) The systematic group also indicated that it was more important to get the right answer \((M = 4.68)\) than did either the control group \((M = 4.02), t(82) = 1.98, p < .05,\) or the heuristic group \((M = 4.03), t(80) = 2.06, p < .05.\) However, the heuristic group did not differ from the control group in their mean response to either item \((t < 1 \text{ for both comparisons})\). The systematic group also took more time to complete the dependent measures \((M = 804 \text{ sec.})\) than did the control group \((M = 629 \text{ sec.}), t(81) = 3.20, p < .005,\) or the heuristic group \((M = 531 \text{ sec.}), t(79) = 4.83, p < .001.\) The heuristic group took less time to complete the dependent measures than did
TABLE 1
Regression Results Predicting Estimates
From Television Viewing Within Processing Condition

<table>
<thead>
<tr>
<th>Processing condition</th>
<th>Crime estimates</th>
<th>Occupation estimates</th>
<th>Affluence estimates</th>
<th>Marital discord estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control condition (n = 40)</td>
<td>Heuristic condition (n = 38)</td>
<td>Systematic condition (n = 44)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predictor</td>
<td>β</td>
<td>ΔR²</td>
<td>Predictor</td>
<td>β</td>
</tr>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.19</td>
<td>Age</td>
<td>-.17</td>
<td>Age</td>
</tr>
<tr>
<td>GPA</td>
<td>.05</td>
<td>GPA</td>
<td>-.05</td>
<td>GPA</td>
</tr>
<tr>
<td>Income</td>
<td>-.01</td>
<td>Income</td>
<td>-.08</td>
<td>Income</td>
</tr>
<tr>
<td>Sex</td>
<td>.30*</td>
<td>Sex</td>
<td>.57**</td>
<td>Sex</td>
</tr>
<tr>
<td>Need for cognition</td>
<td>-.25</td>
<td>Need for cognition</td>
<td>.19</td>
<td>Need for cognition</td>
</tr>
<tr>
<td>Controls (block)</td>
<td>.20</td>
<td>Controls (block)</td>
<td>.32**</td>
<td>Controls (block)</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV viewing</td>
<td>.39</td>
<td>TV viewing</td>
<td>.37</td>
<td>TV viewing</td>
</tr>
</tbody>
</table>

**Crime estimates**

**Occupation estimates**

**Affluence estimates**

**Marital discord estimates**

N = 122.

*p < .10. **p < .05. ***p < .01.
the control group, \( t(76) = 2.03, p < .05 \). The manipulation checks as a whole suggest that the systematic group was more involved with the task than the other two groups, which was the intent of the manipulation. The heuristic group answered faster than the control group per its instructions to the participants to answer off the top of their head, but the heuristic group was not more involved than the control group.

Cultivation Judgments

The dependent measures were analyzed as a function of processing condition and participants’ self-reported level of television viewing. Television viewing was treated as a continuous variable and processing condition was treated as a class variable. Age, income, GPA, sex (dummy coded: 0 = male, 1 = female) and need for cognition (treated as continuous) were included as control variables in each analysis.

To assess the extent to which television viewing is related to the social reality estimates, multiple regression analyses were conducted for each experimental condition. The control variables were entered in the first step, and television viewing was entered in the second step. (Examination of the residuals and correlation matrix indicated that the regression assumptions were plausible.) If television viewing is related to the social reality estimates over and above the effect of the control variables, then the entry of television viewing in the second step should be significant.

Television viewing was expected to be related to the social reality estimates in both the control condition and the heuristic condition. However, the effect of television viewing should be eliminated in the systematic condition. Data bearing on these possibilities are shown in Table 1.\(^6\) In the control condition, the change in \( R^2 \) due to the entry of television viewing in the second step of the regression was significant for estimates of crime and estimates of occupations, approached significance for estimates of affluence, but was not significant for estimates of marital discord. The positive \( \beta \)s indicate that television viewing was positively related to the estimates. Similar results were noted in the heuristic condition; the change in \( R^2 \) due to the entry of television viewing was significant and resulted in a positive \( \beta \) for all estimates. However, as expected, when participants were induced to process systematically, the change in \( R^2 \) due to entry of television viewing in the second step of the regression was not significant. In all three conditions, the \( \beta \)s were either very near zero or negative. These results suggest that inducing participants to process systematically eliminates the cultivation effect.\(^7\)

These results suggest that the effects noted in the control and heuristic conditions are very similar, and both differ from the effects noted in the systematic condition. These relations between conditions are graphically
Figure 1: Crime Estimates as a Function of Processing Condition and Level of Television Viewing
NOTE: Y-axis values represent averaged z-scores across the 25 crime-related items.

Figure 2: Occupation Estimates as a Function of Processing Condition and Level of Television Viewing
NOTE: Y-axis values represent averaged percentage estimates across the 5 occupation-related items.
Figure 3: Affluence Estimates as a Function of Processing Condition and Level of Television Viewing
NOTE: Y-axis values represent averaged percentage estimates across the 7 affluence-related items.

Figure 4: Marital Discord Estimates as a Function of Processing Condition and Level of Television Viewing
NOTE: Y-axis values represent averaged percentage estimates across the 3 marital discord-related items.
represented in Figures 1–4. The graphs suggest an interaction between television viewing and processing condition when the control and systematic conditions are contrasted and when the heuristic and systematic conditions are contrasted, but suggest no interaction when the heuristic and control conditions are contrasted. To confirm this possibility, regression analyses contrasting each condition to the other were conducted. For each contrast, main effects for television viewing, processing condition, and the control variables were entered into a multiple regression analysis along with a TV Viewing x Processing Condition interaction term. The interaction term was computed as the product of the two variables, which were mean-centered to reduce multicollinearity when the interaction term was employed. Television viewing was again treated as a continuous variable. Examination of the residuals and correlation matrix indicated that the regression assumptions were plausible. Differences in the effect of television viewing on the cultivation judgments as a function of processing condition would be demonstrated by a significant $\beta$ for the interaction term.

Data bearing on these possibilities can be found in Table 2. As the table shows, the $\beta$s for the TV Viewing x Processing Condition interaction terms were significant for all four dependent variables when the systematic and heuristic conditions were contrasted. The effects were very similar when the systematic and control conditions were contrasted, although the interaction term for estimates of marital discord was not significant (recall that no cultivation effect was found for Marital Discord in the control condition). However, none of the same interactions were significant when the heuristic and control conditions were contrasted (all $t$s < 1).

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Control vs. systematic</th>
<th>Heuristic vs. systematic</th>
<th>Heuristic vs. control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crime estimate</td>
<td>-0.46**</td>
<td>-0.34**</td>
<td>-0.08</td>
</tr>
<tr>
<td>Occupation estimate</td>
<td>-0.65***</td>
<td>-0.50***</td>
<td>-0.09</td>
</tr>
<tr>
<td>Affluence estimate</td>
<td>-0.66***</td>
<td>-0.70***</td>
<td>0.12</td>
</tr>
<tr>
<td>Marital discord</td>
<td>-0.39</td>
<td>-0.42**</td>
<td>-0.01</td>
</tr>
</tbody>
</table>

NOTE: The numbers shown in the table represent $\beta$s for the TV Viewing x Processing Condition interaction term. 
$N = 122$. 
*p < .10. **p < .05. ***p < .01.
DISCUSSION

Heuristic Processing

Previous work has provided evidence that heuristic processing in general, and the use of the availability heuristic in particular, can at least in part account for the cultivation effect. That evidence took the form of testing hypotheses relating to the components of the availability heuristic (i.e., accessibility, magnitude of estimates) and showed that accessibility mediates the relation between level of television viewing and the social reality estimates (Shrum, 1996; Shrum & O’Guinn, 1993). Other work has supported this model and further suggests that people use the most accessible examples from memory, even though the examples are likely television related, because they fail to discount the presumably nonveridical television information (Shrum et al., 1998).

This study manipulated processing strategy in order to more directly infer the types of cognitive processes that underlie the cultivation effect and to further investigate issues of source discounting. The results provide a variety of information in this regard. First, the findings suggest that people typically process heuristically when constructing their estimates of social reality. When participants were induced to process heuristically (i.e., asked to answer off the top of their head, without extensive elaboration), the relation between their level of television viewing and the magnitude of their estimates did not differ from that of the control group (which received no processing manipulation). However, when participants were motivated to process systematically, the cultivation effect was eliminated and was significantly lower than the magnitude of the cultivation effect noted in the control and heuristic conditions. These results provide strong, convergent findings supporting the heuristic processing model of cultivation effects.

Source Discounting

The results of this study also speak to the issue of source discounting, although the evidence is indirect. The heuristic processing model suggests that people use the ease with which they can generate exemplars to infer the prevalence of constructs such as crime, occupational prevalence, affluence, and marital discord (the constructs used in this study). The model further suggests that television examples may be used in constructing these prevalence estimates because people fail to source discount, and thus nonveridical sources of information such as television may be used as the basis for judgment. This failure to source discount is a function of
the very conditions that induce heuristic processing: lack of motivation resulting from low task involvement, little concern with accuracy, and lack of accountability for the answers.

The results of this study support this contention. When participants were induced to process systematically by increasing their motivation, task involvement, concern with accuracy, and accountability, television had no influence on their social reality estimates. Moreover, as Figure 1 shows, this effect was for the most part concentrated in the estimates of heavier viewers. That is, the estimates of lighter viewers differed little regardless of experimental condition, but the estimates of heavier viewers in the systematic condition tended to be lower than the estimates of heavier viewers in the other two conditions. This pattern of results is very similar to the pattern obtained by Shrum et al. (1998) in their source-priming studies.

Although these results support the notion that lack of source discounting is due to low motivation associated with heuristic processing, it is possible that lack of source discounting may also be due to the inability to correctly ascertain the source of the information used in constructing the social reality judgments (Shapiro & Lang, 1991; for a discussion of source confusion, see Johnson et al., 1993; Wilson & Brekke, 1994). There is in fact some evidence that the general tendency to confuse source characteristics is related to cultivation. Mares (1996) found that those who had a tendency to mistake fiction for fact (i.e., to think information came from the news when it in fact came from a movie trailer embedded within the news) exhibited stronger cultivation effects than those who tended to make source-discounting errors in the opposite direction (i.e., mistake fact for fiction). Thus, even when attempts are made to source discount, an inability to accurately do so may affect judgments.

It is also possible that source-monitoring errors may be a function of involvement at the time of encoding (i.e., during viewing). Wyer and Radvansky (1999) note in their discussion on situation models that people for the most part do not think extensively about information they acquire from television (Kubey & Csikszentmihalyi, 1990). Consequently, when situation models are constructed using fictitious television characters and events, the situation models may not be sufficiently tagged as fictitious and thus may be used as a basis for real-world judgments.

Inconsistent Effects for Marital Discord

Support for the hypotheses of this study has to be qualified somewhat: A cultivation effect was not noted in the control condition for estimates of marital discord. It is not completely clear why this is so, but a number of explanations are plausible. First, even though cultivation effects for mari-
tal discord have been found for both percent estimate measures (Shrum, 1996) and attitude measures (Shrum, 1999b), the samples for those studies consisted of only very heavy or very light soap opera viewers. However, this study used a full range of viewers. Second, even though the questions were very similar between the two studies, the reliability for the scale used in this study was low ($\alpha = .56$), which may have contributed to the null findings. However, a cultivation effect was obtained in the heuristic condition, making this explanation less likely. It may be worth noting that even though Shrum (1996) found a cultivation effect when estimates of marital discord were used as dependent variables, the results of that study did not support an availability heuristic explanation. Accessibility (reaction time) was not related to the estimates, suggesting that heuristic processing may not have accounted for this particular cultivation effect. The results of this study provide similar evidence. Only when participants were induced to process heuristically did they exhibit a cultivation effect for estimates of marital discord.

Precisely why people would not process heuristically for estimates of marital discord is unclear. It may be that this particular topic is more involving than the others (e.g., greater personal relevance, more direct experience via friends and family), which induced a more systematic processing mode. Alternatively, it may be that a restriction of range in responses for the marital discord items suppressed the detection of an effect. The possible restriction of range may have resulted from the fact that the base rate for the marital discord items is substantially higher than the base rate for the other dependent variables, particularly the items measuring the prevalence of crime and particular occupations.

Alternative Explanations

Other heuristics. In applying the concepts of heuristic processing to cultivation effects, the model presented here has focused primarily on the application of the availability heuristic. Although such a narrow focus serves the purpose of simplicity, it need not be this restrictive. The heuristic processing model of cultivation effects should allow for any number of heuristics to be employed, depending on the judgments required.

In fact, there are several heuristics that could just as easily account for cultivation effects, particularly first-order cultivation effects (i.e., those concerned with frequency or probability estimates). One such heuristic, the simulation heuristic, suggests that people base their estimates of the frequency or probability of an event occurring on the ease with which the event can be imagined (Kahneman & Tversky, 1982). Note that this process differs only slightly from recalling an actual example. It is plausible that repeated examples of particular constructs that frequent television
viewing provides would make it easier to imagine particular events (e.g.,
crime and violence). If so, the application of the simulation heuristic could
account for the latency data presented by Shrum and O’Guinn (1993) and
Shrum (1996), as well as the results in the heuristic and control conditions
of this study. However, the simulation heuristic has difficulty in account-
ing for the source-discounting data (Shrum et al., 1998). Moreover, recent
work by Busselle (in press) also suggests that the accessibility of exem-
plars plays a role in the construction of cultivation-type judgments.

Another heuristic that may play a role in the relation between televi-
sion viewing and social judgments is the *representativeness heuristic*
(Kahneman & Tversky, 1972). Application of the representativeness heu-
ristic entails the matching of an event or outcome with some general pro-
totype. The extent to which features of the event to be judged resemble
features of the prototype influences the judgment of the probability of the
event’s occurrence. Thus, an inference regarding the probability of a per-
son committing (or being a victim of) a crime may be based on the extent
to which the features of that person match a general prototype of a crimi-
nal (or victim). Television may influence these judgments in two ways:
through the construction of the prototype and through the accessibility
of the prototype. With regard to prototype construction, heavy viewing
of stereotypical portrayals (e.g., criminals, victims, heros, minorities, pro-
fessionals) may affect the features of the prototype. With regard to acces-
sibility, heavy viewers may develop more accessible prototypes than light
viewers (Shrum, 1999c).

As Sherman and Corty (1984) have indicated, which heuristic people
use at any given time is often a function of the type of information that is
the most accessible at the time of judgment. If an actual example is more
accessible than a prototype, the availability heuristic is likely to be ap-
plied rather than the representativeness heuristic. If neither an example
nor a prototype are particularly accessible, then the simulation heuristic
may be applied.

Recency versus frequency of viewing. The enhanced accessibility of infor-
mation for heavier viewers that results from the frequent accumulation
of television information has been the focus of the explanations for the
cultivation effect thus far. However, as noted earlier, factors other than
frequency can influence the accessibility of constructs, in particular, the
recency of activation of a construct. Thus, it could be that the cultivation
effect results from the recent storage of television information and the
effects of television viewing frequency noted in the regression analyses
could then be explained by the fact that heavy viewers should be more
likely to have viewed television recently.
Although whether the factor influencing accessibility is frequency or recency of viewing has no bearing on the heuristic processing model, it may have implications for cultivation theory in general, in particular whether the effect may be considered long-term or short-term. In fact, Berkowitz (1984) has suggested that the cultivation effect can be explained as a short-term priming effect, and Tamborini, Zillmann, and Bryant (1984) found that certain cultivation effects obtained in an experimental manipulation dissipated after a few days. Moreover, regardless of whether frequency or recency of viewing is the main effect, decisions made through heuristic processing tend to be less stable and less resistant to change than decisions made through systematic processing.

Yet, such processes are not necessarily problematic for the notion that cultivation effects are long-term. First, the distinction between short-term and long-term is ambiguous. For cognitive psychologists, it may refer to the length of time information is stored in short-term memory; for cultural anthropologists, it may refer to generations. Second, even if the effects of television viewing on accessibility are short-term (for argument’s sake, say 48 hours), important decisions still get made within that period of time, and heavy viewers are presumably receiving a fairly steady dose of very consistent and formulaic information. In addition, these decisions may then be recalled (rather than recomputed) when needed at a later time, thus becoming ingrained within the decision-making process of a particular person. Finally, once decisions are made, even from priming effects in the short term, television may then simply serve to reinforce those beliefs by consistently providing confirming evidence. This concept of constant reinforcement is a key component of cultivation theory (Gerbner et al., 1994).

**Results are sample-specific.** A counterargument to the inferences made from the results presented here is that the results may not generalize from the student sample to the general population. To effectively make such a claim, however, a case must be made that the students would somehow behave differently than the general population. For example, it could be that students differ from other adults in the amount of effort they put into answering the questions. However, it seems just as plausible to surmise that students would put more effort into answering the questions compared to other adults (answering questions is part and parcel of their college experience) as it would be to surmise that they would put in less effort (they are not being graded). Alternatively, the ease with which systematic processing is induced may differ between students and other adults. Yet the important finding is not whether systematic processing occurs, but what happens when it does.
Implications

The results of this study suggest that there are indeed ways to reduce the effect of television on social reality. If people can be persuaded to avoid heuristic or "top of the head" methods of judgment (Taylor & Fiske, 1978) and instead carefully scrutinize more information, the effects of television viewing may be mitigated. It is important to note, however, that the degree of persuasion need not be great. Shrum et al. (1998) found that merely calling people's attention to their television viewing habits was sufficient to eliminate the cultivation effect; in the study reported here, making the judgments important to the participant also eliminated the cultivation effect. Taken together, the results of the current study and Shrum et al. (1998) suggest that not only would programs designed to increase such things as media literacy likely be successful, but extensive teaching may not be necessary.

The role of task involvement in the construction of cultivation judgments may also have implications for the relation between data collection method and cultivation effects. For example, it seems likely that certain types of survey methods are more involving for the respondent than other methods. In particular, personal interviews may be more involving than telephone or mail surveys. If so, it suggests that smaller cultivation effects may be obtained when data are collected through personal interviews. Further, heuristic processing may be induced by things other than involvement, such as heavy time pressure. Thus, if data collection methods such as telephone surveys produce more time pressure than other methods, respondents may be more likely to process heuristically and thus produce larger cultivation effects than when other data collection methods are used (Shrum, 1999a).

The results of this study, and the heuristic processing model in general, have a number of implications for cultivation research. For one, it may seem tempting to infer that the results presented here are damaging to cultivation theory. After all, the results show that the cultivation effect can be explained in part by the fact that people simply don't give a lot of thought to their answers. In other words, they process heuristically, and the output of such processing must be inferior. Yet this conclusion would be premature: People make heuristic judgments all the time. In fact, close scrutiny of all or even most of the relevant information available to a person in the course of decision making may be the exception rather than the rule (Smith, 1994; Wyer & Srull, 1989), and there is mounting evidence to suggest that much of this decision-making process is automatic rather than controlled (Bargh & Chartrand, 1999). Examples of heuristic judgments might include answers to pollsters, voting decisions when little is known about a candidate, first impressions, whether to avoid someone
on the street, whether to buy safety protection devices such as an alarm system or handgun, or how to react in a dangerous situation. In fact, just about any decision made quickly is likely to be made using some sort of heuristic.

Conclusion

Some people may conclude that the findings of this study that document the conditions under which a cultivation effect does not hold lessen its impact as a scientific theory. I think just the opposite is true. The research presented here is simply the next step in what Kuhn (1962) called normal science. According to Kuhn, initial inquiries into a phenomenon are concerned with establishing its existence (what Reis & Stiller, 1992, call first-generation research). Later research, which Kuhn characterized as puzzle-solving (Reis & Stiller, 1992), builds on the initial work by asking more precise research questions, employing more complicated experimental designs, and developing more sophisticated theory. This second generation of research may include such things as “identifying moderator variables and boundary conditions, verifying underlying mechanisms and mediating processes, examining contradictions between competing theories, and integrating seemingly independent lines of research” (Reis & Stiller, 1992, p. 465). The development of a cognitive process model of cultivation effects, and the studies that test this model, are examples of this second generation of research.

NOTES

1. The terms heuristic and systematic processing are most often used in reference to dual-processing models of persuasion. Examples include the Heuristic-Systematic Model (Chaiken, 1980) and the Elaboration Likelihood Model (Petty & Cacioppo, 1986). In this context, the processes involve on-line attitude judgments (i.e., attitude judgments made in real time based on information that is directly present). However, the same general processes (application of heuristics vs. careful scrutiny of information) can occur when judgments are memory-based (i.e., judgments based on information retrieved from memory) and apply not just to attitude judgments but to any type of judgment (e.g., beliefs, frequency or probability judgments, etc.; Hastie & Park, 1986).

2. The proposed model applies primarily to first-order cultivation judgments. First-order judgments are ones that ask people to provide prevalence estimates of particular constructs (e.g., the percentage of people involved in a violent crime, the percentage of couples who get a divorce, the percentage of workers that are lawyers, etc.), as opposed to second-order judgments, which pertain to attitudes and beliefs. Because the model attempts to account for how television influences the judgment construction process, it is important that the judgments are constructed in real time, rather than simply reflecting the retrieval of a prior judgment. Thus, because it is extremely unlikely that people have first-order type judgments available in memory, they are useful for investigating real-time judgments. The model
could also apply to second-order judgments, but only to the extent that these judgments are also constructed in real time. Because no face-valid a priori assessment can be made as to whether the attitudes people provide would be constructed in real time or whether they represent a previous judgment that was retrieved, the focus has necessarily been on first-order cultivation judgments.

3. Although the terms “accessibility” and “availability” are often confused and sometimes even used interchangeably, they are distinct terms. The availability of information refers to whether the information exists in memory, whereas the accessibility of information refers to how easy the information is to recall. The confusion stems partly from Tversky and Kahneman's (1973) use of the term “availability heuristic,” which in fact refers to a heuristic that uses the degree of accessibility of information (rather than availability) as a basis for judgment (Bruner, 1957; Higgins & King, 1981; Tulving & Pearlstone, 1966; Shrum, 1996).

4. The model is generally concerned with motivation to consider source. However, it is also possible that even when people are motivated to expend the effort to consider the source of the information they retrieve, they may make errors in their attribution of source (Johnson, Hashtroudi, & Lindsay, 1993; Mares, 1996; Shapiro & Lang, 1991; Shrum, 1997; Wyer & Radvansky, 1999).

5. Distributions of latency measures are often positively skewed (i.e., a long tail of slow latencies) and a reciprocal transformation is recommended to adjust for this skewness (Fazio, 1990). However, such skewed distributions are typically obtained when response times are short (e.g., less than ten seconds). In this experiment, the manipulation checks involved much longer response times and skewness tended to be minimal. Regardless, the data were reanalyzed using reciprocally transformed latencies. As expected, the results were unaffected by the transformation.

6. Given that the control variables are only of minor interest in themselves, for brevity and clarity of presentation, the βs for the control variables in step 2 are not shown. Only slight changes in terms of significance resulted from the entry of television viewing in the second step of the regression. These changes are: For the crime estimates, sex becomes significant at \( p < .05 \); for the occupation estimates, need for cognition no longer approaches significance (\( p > .10 \)); for marital distrust estimates, age becomes significant at \( p < .05 \) but need for cognition no longer approaches significance (\( p > .10 \)).

7. It is possible that the level of viewing of particular program categories is the primary influence on the estimates rather than total television viewing; total television viewing may relate to the estimates only to the extent that total viewing correlates with the viewing of particular categories. However, when the individual program categories were entered as predictor variables, none of them reduced the effect of total television viewing to nonsignificance, suggesting that at least for this sample, total television viewing is the appropriate predictor variable.

8. For the sake of ease and clarity of presentation, points on the x-axis (light and heavy TV) represent means for each group derived from a median split of total television viewing.

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