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On the Encoding of Stereotype-Relevant Information Under Cognitive Load

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This research compared free recall and recognition memory for stereotype-consistent and stereotype-inconsistent information as a function of attentional capacity during encoding. Whereas recall was better for consistent information under conditions of limited capacity, recognition accuracy favored inconsistent information in the same conditions. Contrary to previous theorizations, these data demonstrate that stereotype-inconsistent information is encoded more thoroughly and represented more accurately in memory than stereotype-consistent information when resources are depleted. The recall advantage for consistent information appears to be due to retrieval advantages rather than more thorough encoding or representation. Implications of these findings for models of stereotype efficiency are discussed.

In recent years, a considerable amount of research has focused on the efficiency function of stereotypes. This research has demonstrated that people are particularly likely to rely on stereotypes when processing capacity is low (e.g., Bodenhausen, 1990; Bodenhausen & Lichtenstein, 1987; Gilbert & Hixon, 1991; Kim & Baron, 1988; Kruglanski & Freund, 1983; Macrae, Hewstone, & Griffiths, 1993; Pratto & Bargh, 1991; Stroessner & Mackie, 1993; Wilder & Shapiro, 1989). Moreover, the application of stereotypes in such demanding situations preserves resources that may be applied to other processing goals at hand (e.g., Macrae, Milne, & Bodenhausen, 1994; Sherman, Lee, Bessenoff, & Frost, 1998). Thus, stereotypes provide conceptual frameworks that increase processing efficiency (see Hamilton & Sherman, 1994, for a review).

The tendency to rely on stereotypes to a greater degree when capacity is low also influences memory for stereotype-relevant material in important ways. In particular, a number of researchers have shown that whereas stereotype-inconsistent information is recalled as well or better than stereotype-consistent information under normal encoding conditions, it is recalled less well than stereotype-consistent information under conditions of reduced capacity (e.g., Bodenhausen & Lichtenstein, 1987; Macrae et al., 1993; Stangor & Duan, 1991; Stangor & McMillan, 1992). These findings have been understood in terms of schematic principles of memory (e.g., Minsky, 1975; Neisser, 1976), which suggest that stereotypes (and other expectancies) facilitate the encoding and representation of consistent as compared to inconsistent information in memory (e.g., Bodenhausen, 1988; Bodenhausen & Lichtenstein, 1987; Bodenhausen, Macrae, & Garst, 1997; Hamilton & Sherman, 1994; Macrae et al., 1993; Macrae, Milne, & Bodenhausen, 1994; Macrae, Stangor, & Milne, 1994; Miller & Turnbull, 1986; Stangor & Duan, 1991; Stangor & McMillan, 1992; Taylor & Crocker, 1981). Two mechanisms have been proposed to explain this schematic filtering. First, because it fits with an existing expectancy, stereotype-consistent information is simply easier to comprehend than stereotype-inconsistent information and is, therefore, more likely to be successfully encoded into memory. This is particularly likely to be true when resources are low and perceivers are not able to engage in the kinds of attributional processes that typically occur during the encoding of inconsistent information (e.g., Bodenhausen & Lichtenstein, 1987; Macrae et al., 1993; Stangor & Duan, 1991; Stangor & McMillan, 1992). Second, due to motivational and efficiency-related concerns, perceivers may simply ignore stereotype-inconsistent infor-

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mation (which challenges accepted stereotypes and is difficult to process) and instead may devote their attentional resources toward stereotype-consistent information (Bodenhausen, 1988; Bodenhausen & Lichtenstein, 1987; Bodenhausen et al., 1997; Fiske & Neuberg, 1990; Hamilton & Sherman, 1994; Macrae, Milne, & Bodenhausen, 1994; Stangor & Duan, 1991; Stangor & McMillan, 1992; Taylor & Crocker, 1981). This attentional filter also is presumed most likely to take effect when processing capacity is limited and the usefulness of stereotypes as simplifying devices is maximized. As a result of these filtering mechanisms, it has been argued that when resources are low, consistent information is more successfully encoded into memory than inconsistent information.

Methodological Concerns

However, there are both methodological and theoretical reasons to question the extent to which these findings reflect differences in the encoding and representation of consistent and inconsistent information. The methodological concern is that free recall is not a clear indicator of how well stereotype-consistent and stereotype-inconsistent information have been represented in memory. Performance on measures of free recall reflects not only encoding and representation but also retrieval. Thus, free recall advantages for consistent over inconsistent information may not reflect enhanced representation of consistent as compared to inconsistent information but rather may reflect the greater ease with which consistent information is retrieved from memory (i.e., its accessibility).

In fact, there are a variety of mechanisms that favor the retrieval of consistent over inconsistent information, even if the two kinds of information have been encoded equally thoroughly. First, stereotypes provide useful retrieval cues that promote access to consistent, but not inconsistent, information (e.g., Dijksterhuis & van Knippenberg, 1996; Graesser, 1981; Rothbart, Sriram, & Davis-Stitt, 1996; Tulving & Pearlstone, 1966; van Knippenberg, & Dijksterhuis, 1996). Such cues are particularly effective to the extent that the stereotype is used to interpret consistent information during encoding (which is presumed most likely to occur when capacity is low). Second, recall of consistent information may be enhanced by expectancy-driven search strategies (e.g., Graesser, 1981; Hirt, 1990; Hirt, Erickson, & McDonald, 1993; van Knippenberg & Dijksterhuis, 1996). Finally, recall of consistent information may be inflated by response biases that lower the criteria for reporting expected information (e.g., Graesser, 1981; Stangor & McMillan, 1992).

Indeed, there is ample evidence that consistent information is more easily retrieved than inconsistent information (e.g., Dijksterhuis & van Knippenberg, 1996; Fyock & Stangor, 1994; Rothbart et al., 1996; Stangor & McMillan, 1992; van Knippenberg & Dijksterhuis, 1996). However, and of utmost importance to our current concerns, recognition measures of memory discrimination, which minimize the retrieval component of memory, have consistently demonstrated better memory for inconsistent than consistent information (e.g., Graesser, 1981; Gregg, 1976; Srull, 1984; Stangor & McMillan, 1992). Recognition tests minimize the retrieval component of memory in two ways (see Srull, 1984, for a thorough discussion of this matter). First, participants are not required to reproduce any of the test stimuli on their own. Rather, recognition tests re-present the test material along with foil items that were not initially presented and participants are asked to decide which items were previously encountered and which were not. Thus, performance on recognition tests is minimally influenced by factors that enhance the retrievability of consistent as compared to inconsistent information. Instead, recognition tests measure the extent to which information has been encoded well enough to discriminate it from information that has not been encountered (Graesser, 1981; Grier, 1971; Srull, 1984; Stangor & McMillan, 1992).

Recognition tests also minimize retrieval effects by controlling for expectancy-consistent response biases. In measures of memory discrimination, two separate components of performance can be identified. One component measures the extent to which perceivers are able to discriminate between information they have and have not encountered. This measure mathematically removes the effects of guessing strategies and response biases that might otherwise inflate performance on expectancy-consistent material. The second component directly measures the extent of response bias.

We are not suggesting that recognition measures are inherently less biased toward expected information than are free recall measures. Rather, it is simply the case that the bias component can be eliminated from measures of discrimination and independently assessed. We also do not wish to suggest that recognition measures are better measures of memory than are free recall measures: The two measures simply assess different aspects of memory. Whereas free recall is particularly useful for measuring an item's accessibility in memory, it is not a very clear indicator of how accurately that item has been represented in memory (particularly expectancy-consistent information that enjoys various retrieval advantages). In contrast, because recognition measures minimize the retrieval component of memory, they are not very useful for measuring the accessibility of different information in memory but are highly sensitive tests of whether a given piece of information has been encoded sufficiently to distinguish it from nonpresented information (e.g., Graesser, 1981; Stangor & McMillan, 1992). Given these facts, there is reason to question the extent to which the accumulated free recall data support the idea that stereotype-consistent information is encoded more thoroughly and better represented in memory than stereotype-inconsistent information under conditions of limited capacity.[1]

Theoretical Considerations

The methodological concerns raised above are heightened by the fact that there are theoretical reasons to expect that inconsistent rather than consistent information would be more thoroughly encoded into memory under conditions of limited capacity. A number of researchers have argued that schemata have both facilitatory and inhibitory effects on the encoding of expectancy-consistent information (Bobrow & Norman, 1975; Johnston & Hawley, 1994; Johnston, Hawley, Plewe, Elliott, & DeWitt, 1990; Schank, 1982; Schank & Abelson, 1977; Sherman et al., 1998; von Hippel, Jonides, Hilton, & Narayan, 1993; von Hippel, Sekaquaptewa, & Vargas, 1995). On one hand, schemata facilitate the encoding of consistent information by providing explanatory frameworks that may be used to interpret such events. However, the consequence of this conceptual fluency is that perceivers with an applicable schema need not expend resources encoding the details of consistent information. Indeed, because the basic gist of consistent behaviors can be extracted so easily, attention may shift toward the encoding of more difficult stimuli (e.g., expectancy-inconsistent information). Thus, although the basic gist of consistent information may be better understood, the details of inconsistent information will be more thoroughly encoded and represented in memory. This may be particularly true under conditions of limited capacity when schematic (gist) encoding of consistent information is most likely to occur as the need for efficient distribution of attentional resources is maximized.

In support of this view, we have shown that attention is particularly likely to be directed away from stereotype-consistent and toward stereotype-inconsistent information under conditions of limited processing capacity (Sherman et al., 1998). In addition, Stangor and McMillan's (1992) meta-analysis showed that factors that are assumed to make processing more difficult (number of target stimuli presented, number of traits about which information was presented, and stimulus exposure time) increased recognition sensitivity for inconsistent relative to consistent information. Thus, there is both theoretical and empirical support for the possibility that when resources are low, inconsistent information is encoded more carefully and stored more accurately in memory than is consistent information.

Overview

The purpose of this research was to directly compare the influence of processing capacity on recall and recognition memory for stereotype-consistent and stereotype-inconsistent information in the same experiment. Following previous research, we expected that recall would favor consistent information, particularly under conditions of limited capacity. At the same time, we expected that recognition accuracy would favor inconsistent information, especially when resources were depleted. Thus, we predicted that once the retrieval component of memory was accounted for via the recognition measure, inconsistent information would be shown to be more thoroughly encoded and represented in memory than consistent information, particularly when processing capacity was depleted. In contrast, according to schematic filter models, the data from the recall and recognition measures should be identical: Stereotype-inconsistent information should be remembered as well or better than stereotype-consistent information when attentional capacity is high but should be remembered less well than stereotype-consistent information when capacity is low.

Method

Participants. For their participation, 109 students at Northwestern University were given partial course credit in an introductory psychology course. Participants were run in sessions of 1 to 4 people.

Materials and procedure. Upon arrival, participants were randomly assigned to be in either the free recall or recognition condition. The methods and procedures were identical for the two conditions prior to collection of the final dependent measure. Participants were asked to engage in an experiment on impression formation. They were told that they would be reading some information that had been drawn from a magazine article about a person named Bob Hamilton. Participants were told that Bob was either a skinhead or a priest who lived in Chicago. The description of Bob consisted of 30 behaviors, 10 of which were pretested to be kind (e.g., gave a stranger a quarter to make a phone call), 10 of which were pretested to be unkind (e.g., shoved his way to the center seat in the movie theater), and 10 of which were pretested to be irrelevant to the kind/unkind dimension (e.g., bought a new shirt). For participants in the skinhead condition, the unkind behaviors were stereotype-consistent and the kind behaviors were stereotype-inconsistent. For participants in the priest condition, the kind behaviors were stereotype-consistent and the unkind behaviors were stereotype-inconsistent. Thus, the same behaviors served as both stereotype-consistent and stereotype-inconsistent stimuli, depending on the target. The behaviors were presented randomly on microcomputers, one every 6 seconds.

As they formed their impressions, some participants also were placed in a low-processing-capacity condition. These participants were further informed that the experiment was concerned with people's ability to do multiple tasks at the same time. A cognitive load was manipulated by asking these participants to hold an eight-digit number in memory as they performed the impression formation task. This task has been used successfully to deprive participants of processing resources in past research (e.g., Gilbert & Hixon, 1991; Sherman et al., 1998). To assess compliance, these participants were asked to write down the eight-digit number on a slip of paper at the end of the impression formation task.[2]

Following completion of the impression formation task, participants engaged in a 5-minute filler task to clear the behavioral stimuli from short-term memory. Subsequently, participants performed either a free recall or a recognition task. For the free recall task, participants were given 5 minutes to write down as many of the behaviors from the impression formation task as they could remember. For the recognition task, all 30 behavioral stimuli and 30 foil behaviors (10 kind, 10 unkind, 10 irrelevant) were presented to participants. Upon the presentation of each item, participants were instructed to press either a button marked "yes" or a button marked "no" on their keyboards, depending on whether the item had been used to describe Bob in the impression formation task. Based on these responses, A′ indices of recognition accuracy for consistent and inconsistent items were computed for each participant and served as dependent measures (see below).

Results

For purposes of clarity, we first report separate analyses of the free recall and recognition measures. Subsequently, we present a blocked *z*-score analysis that directly compares performance on the two measures. This analysis will test our key prediction that cognitive load influences recall and recognition of consistent and inconsistent information in opposing directions.

Free recall. The proportions of consistent and inconsistent items correctly recalled were analyzed in a 2 (processing capacity: high vs. low) × 2 (target type: skinhead vs. priest) × 2 (stimulus type: consistent vs. inconsistent) ANOVA, with repeated measures on the last factor. Replicating previous results, this analysis revealed a significant Capacity × Stimulus Type interaction, $F(1, 50) = 5.30$, $p < .05$. Whereas recall was slighter higher for inconsistent ($M = .39$) than consistent items ($M = .36$) in the high-processing-capacity condition, $F(1, 50) = 1.67$, *ns*, recall was higher for consistent ($M = .41$) than

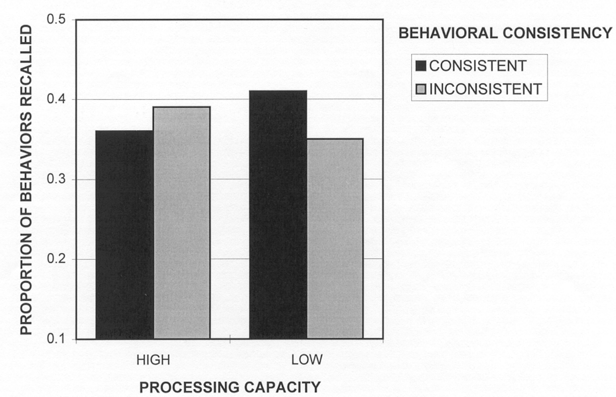

Figure 1 **Free recall as a function of stereotype consistency and processing capacity.**

inconsistent items ($M = .35$) in the low-capacity condition, $F(1, 50) = 3.90$, $p < .10$ (see Figure 1).[3]

Not unexpectedly, the results also revealed a significant Target × Stimulus Type interaction, which demonstrated that unkind behaviors (skinhead-consistent, priest-inconsistent) were recalled better than kind behaviors (priest-consistent, skinhead-inconsistent), $F(1, 50) = 83.5$, $p < .05$. Because negative behaviors are somewhat rare, they tend to draw attention (e.g., Fiske, 1980). There also was a three-way interaction between target type, processing capacity, and stimulus type, $F(1, 50) = 11.27$, $p < .05$. This interaction showed that the relative advantage for consistent over inconsistent items in the low- versus high-capacity condition was stronger when the consistent items were kind and the inconsistent items were unkind (the priest condition). This suggests that the influence of cognitive load on encoding and memory for consistent and inconsistent information may be influenced by the evaluative nature of the consistent and inconsistent information. However, this interaction did not replicate on the recognition measure.

Recognition. The nonparametric measure A′ (Grier, 1971) was chosen as the index of memory discrimination. It is necessary to use nonparametric measures (as opposed to measures such as d′) when participants occasionally produce perfect memory discrimination (i.e., proportion of hits = 1, proportion of false alarms = 0), as they did in the present experiment. A′ takes into account both hit rates (the proportion of times participants correctly identify that a previously presented item is old) and false alarm rates (the proportion of times participants incorrectly call foil items old) in its assessment of recognition accuracy (see Grier, 1971, for the exact formula), thereby controlling for the influence of guessing strategies and response biases.

The A′ recognition accuracy measures for consistent and inconsistent items were analyzed in a 2 (processing capacity: high vs. low) × 2 (target type: skinhead vs. priest) × 2 (stimulus type: consistent vs. inconsistent) ANOVA, with repeated measures on the last factor. This analysis yielded a significant main effect for processing capacity, which demonstrated that recognition accuracy was greater in the high- (M = .974) than low- (M = .914) capacity condition, $F(1, 51) = 10.70$, $p < .05$. There was also a marginally significant main effect for stimulus type, which showed that inconsistent items (M = .952) were recognized more accurately than consistent (M = .936) items, $F(1, 51) = 3.35$, $p < .08$. However, planned comparisons showed that this tendency held only in the low–capacity condition. Whereas inconsistent items (M= .928) were recognized more accurately than consistent items (M= .900) in the low-capacity condition, $F(1, 51) = 5.42$, $p < .05$, consistent (M= .972) and inconsistent (M= .976) items were recognized equally well in the high-capacity condition, F < 1 (see Figure 2). The Capacity × Stimulus Type interaction was not reliable, $F(1, 51) = 1.88$, p = .18. Finally, there was a significant Target × Stimulus Type interaction, demonstrating that unkind behaviors were recognized more accurately than kind behaviors, $F(1, 51) = 17.72$, $p < .05$.

Blocked z-*score analysis.* We predicted that variations in processing capacity would influence free recall and recognition memory for expectancy-relevant information in opposite ways. That is, whereas a decrease in processing capacity was expected to enhance free recall of consistent as compared to inconsistent information, it was expected to enhance recognition of inconsistent as compared to consistent information. The most direct way to test this hypothesis is to compare recall and recognition memory within the same analysis. To accomplish this, we conducted a blocked meta-analysis in which the raw data from the recall and recognition measures were converted to *z*-scores within each measurement condition and then combined into an overall ANOVA, with measurement type (recall vs. recognition) as a between-subjects factor (Rosenthal, 1991). This analysis demonstrated the predicted three-way interaction between measurement type, processing capacity, and stimulus congruence, $F(1, 101) = 6.95$, $p < .05$. This interaction reflects the opposing two-way interactions for recall and recognition described above (see Figures 1 and 2). When the dependent measure was free recall, performance favored consistent items when capacity was low; when the dependent measure was recognition accuracy, performance favored inconsistent items when capacity was low. An alternative way to break down the three-way interaction is to compare the results separately for the high- and low-processing-capacity conditions. In the high-capacity condition, there was only a main effect for measurement type, which demonstrated that memory was better on the recognition measure than on the free recall measure, $F(1, 51) = 5.55$, $p < .05$. However, in the low-capacity condition, there was a significant two-way interaction between measurement type and stimulus congruence, $F(1, 54) = 5.43$, $p < .05$. Whereas consistent items were remembered better on the recall measure, inconsistent items were remembered better on the recognition measure (as described in the simple effects analyses above). The results of this meta-analysis provide the clearest support for our predictions.

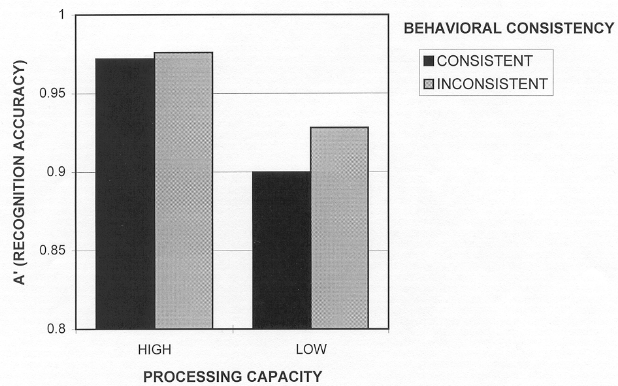

Figure 2 **Recognition accuracy as a function of stereotype consistency and processing capacity.**

Discussion

The results of this experiment demonstrated a sharp dissociation between the effects of cognitive load on recall versus recognition of stereotype-relevant information. This is the first time that such a dissociation has been demonstrated within the same experiment. Together, the recall and recognition results demonstrate that when the retrieval component of memory is factored out, inconsistent information is shown to be more thoroughly represented in memory than is consistent information when processing resources are low. Because recognition measures control for inherent differences in the retrievability of consistent and inconsistent information as well as biased search and response strategies that favor consistent information, the A′ results can be attributed to the fact that when capacity is depleted, inconsistent information is encoded more thoroughly than consistent information. At the same time, these results demonstrate that the low-capacity free recall advantage for consistent over inconsistent information demonstrated here and elsewhere (e.g., Bodenhausen & Lichtenstein, 1987; Macrae et al., 1993; Stangor & Duan, 1991; Stangor & McMillan, 1992) is not due to the more thorough encoding or representation of consistent than inconsistent information. Rather, the recall advantage for consistent information is most likely due to inherent retrieval advantages for expected over unexpected information and to expectancy-based search strategies that favor the retrieval of consistent information.[4]

Although the empirical base was very limited, this recall/recognition dissociation also was suggested by Stangor and McMillan's (1992) meta-analysis. However, those researchers provided a very different explanation for the dissociation than our own. They argued that both the recall advantage for consistent information and the recognition advantage for inconsistent information reflected a filter-like model that favors the encoding and representation of consistent information when capacity is limited. According to their analysis, because perceivers are either unable or unwilling to thoroughly encode inconsistent events when capacity is limited, those events are likely to simply be "tagged" in memory, a relatively superficial process. However, they argued that this tagging process produces greater subsequent recognition (but not recall) than more elaborative modes of encoding, concluding that "conditions that promote processing of incongruent information should reduce (recognition sensitivity) memory for that information" (p. 57). Thus, the recognition advantage for inconsistent items under low-capacity conditions is actually due to the fact that they are more likely to be encoded superficially (i.e., they are tagged) in these conditions. According to this analysis, inconsistent items should be increasingly likely to be tagged as capacity is depleted and should therefore be recognized with increasing accuracy as capacity is depleted, thereby producing a recognition advantage over consistent items, which are not tagged.

However, this proposal is inconsistent with a large body of research showing that decreases in attentional capacity and depth of processing decrease recognition memory (see Craik, Govoni, Naveh-Benjamin, & Anderson, 1996; Craik & Tulving, 1975, for reviews). It is not clear why these basic effects would not hold for the encoding of unexpected information. As such, it is difficult to understand how decreases in thorough processing of inconsistent information when capacity is low would produce a recognition advantage over consistent information in these conditions. Perhaps more directly to the point, Stangor and McMillan's (1992) analysis cannot explain the data from the current experiment, which demonstrated that recognition of both consistent and inconsistent information decreased when capacity was depleted. Thus, a more viable explanation for the recognition data is that inconsistent information is encoded more thoroughly than consistent information when capacity is limited. Furthermore, the dissociation between the recall and recognition findings suggests that the free recall advantage for consistent information in low-capacity conditions is due to differences in the ease with which consistent and inconsistent items may be retrieved rather than to more thorough encoding of consistent items, as has been previously suggested. It is certainly the case that consistent behaviors are easier to comprehend than inconsistent behaviors when resources are scarce (e.g., Macrae, Stangor, & Milne, 1994; Sherman et al., 1998; von Hippel et al., 1993). However, the present research adds to a growing body of evidence that under such conditions, perceivers are content to merely extract the basic gist of consistent behaviors and then move on, without carefully encoding the details (e.g., Sherman et al., 1998).

If stereotype-consistent information is easier to retrieve than stereotype-inconsistent information, then why is inconsistent information often better recalled under normal processing conditions (see Stangor & McMillan, 1992, for a review)? The answer has to do with the explanatory processes that typically occur during the encoding of inconsistent information. Because inconsistent behaviors violate expectancies, people often seek to explain them (e.g., Hastie, 1984). As they engage in this attributional processing, perceivers may compare inconsistent behaviors to other behaviors that the target has performed (e.g., Sherman & Hamilton, 1994). As a result, associative links will be formed between those behaviors. Because inconsistent behaviors become associated to many other behaviors, they have a distinct retrieval advantage over consistent behaviors, which do not receive the same kind of attributional encoding (for a review, see Srull & Wyer, 1989). The retrieval advantage afforded by these associative processes may often obscure the retrieval advantage that would otherwise be enjoyed by consistent information due to retrieval cues (e.g., Dijksterhuis & van Knippenberg, 1996; Graesser, 1981; Rothbart et al., 1996; Tulving & Pearlstone, 1966; van Knippenberg & Dijksterhuis, 1996), expectancy-driven search strategies (e.g., Graesser, 1981; Hirt, 1990; Hirt et al., 1993; van Knippenberg & Dijksterhuis, 1996), and response biases (e.g., Graesser, 1981; Stangor & McMillan, 1992). However, when processing capacity is limited, attributional processing of inconsistent information may no longer take place. As a result, in these conditions, the normal retrieval advantage for expectancy-consistent information may be observed.[5]

In contrast, recognition memory for inconsistent behaviors does not rely so much on the formation of associative links to other behaviors. Because recognition memory does not depend so heavily on retrieval processes, the presence or absence of behavioral associations is relatively unimportant. Rather, what determines perceivers' ability to accurately recognize consistent and inconsistent behaviors is the extent to which they have encoded the details that allow them to distinguish between those behaviors and foil behaviors (e.g., Srull, 1984). In this regard, the present results are consistent with our work showing that the perceptual (orthographic) features of inconsistent behaviors are encoded more thoroughly than the perceptual features of consistent behaviors regardless of processing capacity (Sherman et al., 1998).

Conclusion

The purpose of this article is not to challenge the significance of the recall advantage for consistent information under low-capacity conditions. Indeed, the fact that stereotypical behaviors are more accessible than counterstereotypical behaviors under such conditions has important implications for social judgments. To the extent that target judgments are based on memory for specific behaviors, judgments will be more stereotypical under conditions of limited capacity (e.g., Macrae et al., 1993). It is important to note that such memory-based judgments are particularly likely to occur if perceivers are unable to form impressions "on-line" as they are learning about a target (a situation that may be more common when processing resources are depleted during encoding). Thus, clearly, we do not wish to diminish the importance of the accessibility advantage for consistent information under low-capacity conditions.

Rather, the purpose of this article is to present a more fine-grained analysis of how the availability of attentional capacity influences the encoding and representation of stereotype-relevant information. Our results suggest that the filter metaphor may not be the most appropriate for describing these processes. Perceivers' use of stereotypes appears to be more flexible than often has been assumed. Although the conceptual gist of consistent behaviors is extracted to a greater degree than the gist of inconsistent behaviors when resources are low (e.g., Macrae, Stangor, & Milne, 1994; Sherman et al., 1998; von Hippel et al., 1993), the details of inconsistent behaviors are encoded more thoroughly (also see Sherman et al., 1998). It would seem that the resources that are preserved through the conceptual fluency of consistent behaviors are redirected to assist in the encoding of inconsistent behaviors.

One of the more interesting implications is that although perceivers may come away with very strong impressions that a target has behaved in a stereotypical fashion, they will have very poor memory for the details of specific behaviors. As such, they may be easily misled into misattributing stereotypical behaviors to the target that he or she did not, in fact, perform (Sherman & Bessenoff, 1999). By contrast, such misattributions will be relatively unlikely for counterstereotypical behaviors, which are retained in much more accurate detail. However, although their details are remembered quite accurately, the meanings of inconsistent acts are not well understood, diminishing their impact on impressions (Sherman et al., 1998).

Perhaps one underlying reason for the low-capacity encoding advantage for inconsistent information is that it is simply less critical to retain the details of consistent information. If the details of consistent behaviors are lost, then perceivers may simply rely on their stereotypes to infer the basic gist of what has occurred. Obversely, if the details of inconsistent behaviors are forgotten, the meaning conveyed by those behaviors also will be lost if the initial conceptual encoding of those behaviors has been less than ideal. This is because the basic gist of inconsistent information cannot be reconstructed from the stereotype after the fact. As such, the careful encoding of the details of inconsistent information may act as important insurance against the irreplaceable loss of such information (Sherman, in press). Thus, by taking advantage of the conceptual fluency of consistent behaviors when capacity is low to redirect resources toward the encoding of inconsistent behaviors, perceivers take the fullest advantage of their stereotypic expectancies to gather the most information possible under difficult conditions. This is the essence of efficiency.

NOTES

1. A number of experiments have demonstrated that stereotypes are more likely to influence memory when they are available during both encoding and retrieval than when they are available during retrieval only (e.g., Bodenhausen, 1988; Rothbart, Evans, & Fulero, 1979; but see Cohen, 1981; Snyder & Uranowitz, 1978, for conflicting results; see Fiske & Taylor, 1991, for a review). These results have been taken as evidence that stereotypes do not have a large influence on the retrieval of stereotype-consistent and stereotype-inconsistent information. However, these types of experiments cannot rule out the impact of stereotypes as retrieval cues. According to principles of processing specificity (Tulving & Pearlstone, 1966), stereotypes cannot act as retrieval cues for stereotype-relevant information if they are presented after the initial encoding of that information unless the information was spontaneously interpreted in accord with the stereotype. If the information is not spontaneously interpreted in this way when the stereotype is not present during encoding, then providing the stereotype after encoding does not provide a conclusive test of the stereotype's ability to act as a retrieval cue. It is still possible that when the stereotype is given prior to encoding, information is interpreted in light of the stereotype, which may then be used as a retrieval cue to enhance stereotype-consistent recall.

2. Gilbert (e.g., Gilbert & Hixon, 1991) has noted the difficulties of using participants' responses as a manipulation check. If participants are unable to report the number, it may mean that they neglected to engage in the memory task. Alternatively, it may be an indication that the dual-task manipulation was highly effective at depleting processing capacity. As suggested by Gilbert and Hixon (1991), a cutoff point was established such that participants who incorrectly reported four or more of the digits were considered to have made large errors and were excluded from the data set. No participants made more than four errors in this experiment.

3. All simple effects comparisons of consistent and inconsistent items are based on the mean square error from the full ANOVA.

4. Based on the responses to the recognition test, nonparametric B′ indices of response bias toward consistent and inconsistent items also were computed (Grier, 1971). These indices were analyzed in a 2 (proc-

essing capacity: high vs. low) × 2 (target type: skinhead vs. priest) × 2 (stimulus type: consistent vs. inconsistent) ANOVA, with repeated measures on the last factor. This analysis produced no reliable effects. The fact that there were no differences in response bias toward consistent and inconsistent items suggests that the free recall advantage for consistent over inconsistent items in the low-capacity condition was not driven by different reporting criteria for consistent and inconsistent items. Rather, the data seem to implicate the roles of retrieval cues and search strategies in facilitating stereotype-consistent recall.

5. In fact, the normal retrieval advantage for consistent information may be heightened when capacity is low. As we have already described, stereotypes may be especially likely to be used as frameworks to interpret consistent but not inconsistent information when resources are depleted. As a result, the stereotype would then serve as a particularly effective retrieval cue for consistent behaviors during a free recall task. In addition, because perceivers are much more likely to extract the basic trait meaning of consistent versus inconsistent behaviors when capacity is low, traits also may act as retrieval cues that facilitate the recall of consistent as compared to inconsistent information.

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