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Chapter 5

Attention and Stereotyping: Cognitive Constraints on the Construction of Meaningful Social Impressions

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ABSTRACT

This paper examines the role of attentional capacity in stereotyping processes. We begin with an overview of different theoretical perspectives on this issue. Then we document how recent research has extended our understanding of the relationship between attention and stereotyping. First, we consider how variations in attentional resources influence social categorization, stereotype activation, stereotype application, and stereotype inhibition. Evidence from each of these domains supports the conclusion that stereotype-based impression formation is less resource-consuming than individuation. Second, we examine the role of attentional capacity in the encoding, retrieval, and meta-cognitive processing of stereotypical and counter-stereotypical information. Recent research extends our understanding of exactly how and why stereotype use is relatively efficient.

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Finally, we discuss the need to better specify the conditions under which attention is and is not likely to be impaired. New evidence suggests that such considerations have important implications for understanding stereotyping. We conclude that there is now an abundant variety of evidence underscoring the importance of attentional resources in stereotyping.

Such a general characteristic of human functioning as limited attentional capacity should have an important role to play in thought and action (Mandler, 1985, p. 66).

. . . human attempts to understand the physical or biological environment . . . work(s) within the limits imposed by the capacities of individual human minds . . . A "satisfactory" explanation will manage to preserve personal integrity while at the same time—for reasons of cognitive economy—it will tend towards as much simplification as the situation allows for (Tajfel, 1969, pp. 79, 92).

In a classic contribution to psychological knowledge, George Miller (1956) demonstrated that human mental performance is limited in terms of the amount of information that can be consciously managed at any given time. The upper limit involved was originally estimated by Miller to be 7 ± 2 chunks of information, but subsequent research converged on a value closer to 4–5 chunks (Broadbent, 1975). This cognitive limitation appears to be constant across individuals and social groups (Dempster, 1981), prompting Mandler's (1985) observation that it is a fundamental psychological characteristic of the species that must have general and significant consequences for our mental lives. One implication of this cognitive constraint that has long been recognized is that we often need to develop economizing strategies for dealing with the complexities of the social world (e.g., Bruner, Goodnow, & Austin, 1956; Lippmann, 1922). To be useful, such strategies must permit a meaningful interpretation of the stimulus environment while minimizing the number of discrete chunks of information that must be mentally juggled. For example, Bruner *et al.* (1956) noted that in classification learning experiments, participants typically develop strategies that minimize information storage requirements. Given the evident success of our species in navigating and mastering the external, physical world, we appear to have developed effective strategies for operating within the informational limitations of our inner, mental worlds.

Seminal writers such as Allport (1954) and Lippmann (1922) set the stage for what has become a dominant assumption in much of social psychology, namely that cognitive capacity has important implications for social cognition across a variety of domains, including persuasion (e.g., Chen & Chaiken, 1999; Petty & Wegener, 1999), attitude–behavior consistency (Fazio & Towles-Schwen, 1999), attribution (e.g., Gilbert, 1998; Trope & Gaunt, 1999), and the validation of social information (Gilbert, 1991). These approaches assume that, although the maximal extent of attentional capacity is a constant of human

nature, the momentarily available pool of cognitive resources may sometimes be substantially less than this maximal value. We use the term "cognitive load" to refer to variables that reduce attentional capacity below its maximal value. In the panorama of theories just mentioned, cognitive load is considered to be an important moderator of strategy deployment in social cognition; specifically, qualitatively different social-cognitive processes and outcomes may ensue when resources are particularly constrained vs. when they are ample. The cross-domain theoretical continuity of this work certainly suggests that contingencies of cognitive capacity constitute an important integrative theme in social psychological theory. It thus comes as no surprise that stereotyping researchers have relied upon similar ideas in conceptualizing the nature and determinants of stereotyping and discrimination (for recent reviews, see Bodenhausen, Macrae, & Sherman, 1999; Brewer & Feinstein, 1999; Fiske, 1998).

In the present chapter, we first provide a concise overview of the main ideas in this theoretical tradition. Then we document how recent research has qualified and extended our understanding of the important role of cognitive load in stereotyping phenomena. In particular, we consider: (a) the differential effects of cognitive load on category identification, stereotype activation, stereotype application, and stereotype inhibition; (b) the differential effects of cognitive load on the encoding and retrieval of information that fits or does not fit with stereotypic expectancies; and (c) the differential effects of specific kinds of cognitive loads. Our central thesis is that an abundant variety of research now underscores the importance of cognitive load as one determinant of stereotyping and discrimination. In supporting this view, we will also consider the merits of some recent claims that information-processing limitations play no significant role in the domain of stereotyping (Oakes & Turner, 1990; Spears & Haslam, 1997).

METAPHORS AND METATHEORIES OF STEREOTYPING AND COGNITIVE CONSTRAINT

The guiding assumptions of social psychological theories are often effectively conveyed via metaphors that capture the views of human nature and functioning that are embodied within the theories. So it has been with research on stereotyping and social cognition. In this section we consider some of these guiding metatheories in reviewing how cognitive load has been conceptualized in research on stereotyping.

Cognitive Misers, Mental Sluggards, and Lazy No-goodniks

Fiske and Taylor (1984) famously characterized the social perceiver as a "cognitive miser". This view draws on the recognition that humans are rarely

motivated to engage in the mental activity necessary to optimize their cognitive performance; rather, they seek to do just enough mental work to get by ["satisficing" in Simon's (1978) terminology]. Gilbert and Hixon (1991) were less euphemistic about it; they suggested that people often seek to avoid the trouble of thinking simply because they are mental sluggards, and "a stereotype is the sluggard's best friend" (p. 509). Undoubtedly, many people will react with indignation to this view of mental life. However, as unflattering as this characterization of human nature may be, there is surely a grain of truth in it. Fundamental to this view of stereotyping is the assumption that reliance on theory-based stereotypes is mentally easier than the process of forming a data-based, individuated impression of a novel target. Although taken for granted in much stereotyping research, this view has recently been challenged by Spears and Haslam (1997; see also Kunda & Thagard, 1996), and we will consider their claims momentarily.

It is important to realize, however, that this class of metaphors fundamentally concerns cognitive motivation and not cognitive capacity constraints. Certainly, part of the aversiveness of mental work may come from the fact that it is often rendered difficult by information-processing limitations. Nevertheless, motivation and capacity are largely separable concerns, and conceptualizations of the role of cognitive load must go beyond motivational metaphors if a valid understanding is to be reached. Whereas mental sloth *per se* may well explain, in part, why stereotyping occurs even in the absence of cognitive load, it really cannot capture the phenomenon of differential stereotyping as a function of cognitive load in a satisfying way. For this reason, new metaphors have emerged.

Motivated Tacticians and Efficiency Experts

In the revised version of their classic text, Fiske and Taylor (1991) suggested replacing the cognitive miser metaphor with one of the "*motivated tactician*, a fully engaged thinker who has multiple cognitive strategies available and chooses among them based on goals, motives, and needs" (p. 13). Within this general approach, the need to cope with cognitive constraints can be viewed as a central and frequently recurring problem that is faced by social perceivers and that influences which cognitive strategies they will deploy. While efficiency may be preferable for a lazy perceiver, it is absolutely essential for a mentally busy perceiver. Thus, the metaphor of social cognition that is most relevant for an understanding of the effects of cognitive load is of the social perceiver as an *efficiency expert* (Macrae, Milne, & Bodenhausen, 1994; Sherman, Lee, Bessenoff, & Frost, 1998).

A process is efficient to the extent that it does not require much in the way of attentional resources for its successful execution. Obviously, then, a relatively efficient strategy is likely to proceed unhindered by the introduction of

a cognitive load, whereas more effortful, resource-dependent strategies are likely to be compromised when a load is imposed. With Lippmann (1922), Allport (1954), and many others, we assume that the stereotyping process occurs in a rapid, efficient, and largely automatic fashion, while the process of individuation is much more effortful and resource-consuming. This leads to the central, oft-supported prediction that stereotyping processes will dominate social perception to a greater extent when a cognitive load is imposed (e.g., Bodenhausen, 1990; Bodenhausen & Lichtenstein, 1987; Macrae, Hewstone, & Griffiths, 1993; Macrae *et al.*, 1994; Pendry & Macrae, 1994; Pratto & Bargh, 1991; Rothbart, Fulero, Jenson, Howard, and Birrell, 1978; Stangor & Duan, 1991). When efficiency is called for, social perceivers appear to rely on stereotypes to a greater extent, confirming that these generalized beliefs are indeed a useful tool for an efficiency expert to employ.

Meaning Seekers and Sense Makers

Rejecting both the cognitive miser and the efficiency expert metaphors, several researchers operating within the framework of self-categorization theory have proposed what they see as a very different metaphor for understanding stereotyping (Oakes & Turner, 1990; Spears & Haslam, 1997), namely that of the *meaning seeker*. Spears and Haslam, for example, spend a great deal of space discussing "Economy *vs.* Meaning" (p. 171, emphasis added), curiously assuming that efficiency-motivated perceivers would not be concerned with making sense of the social world. Is there a trade-off between efficiency seeking and meaning seeking? There is no compelling reason to assume so. We take it as entirely self-evident that social perceivers seek meaningful impressions. In our view, the reason why stereotypes are useful to perceivers under cognitive load is precisely because they provide an efficient basis for imbuing social stimuli with meaning.

Although at a general level we see no conflict between the sense-maker and efficiency-expert metaphors, several other aspects of the Spears and Haslam critique are worth considering in some detail. Perhaps the most fundamental disagreement Spears and Haslam have with typical research on cognitive load is the assumption that stereotyping is a less cognitively demanding process than individuation (see also Kunda & Thagard, 1996). They assume instead that the sense-making process, whether directed at an individuated impression or a group-based impression, is equally cognitively demanding, and to the extent that a cognitive load disrupts one, it should disrupt the other to the same degree. We have recently spelled out in considerable detail a variety of logical and empirical arguments refuting the claim that individuation and stereotyping are similar in their cognitive demands (Bodenhausen *et al.*, 1999). Space constraints prevent us from reiterating all of these arguments here, but it may suffice to note as a summary argument that stereotypes represent a rich,

pre-existing source of knowledge that can be activated as an integrated set or "chunk" of information bearing on a stimulus person. Because the limitations of attentional capacity are determined by the number of meaningful chunks rather than isolated bits of information (Miller, 1956), an activated stereotypic structure provides rich information gain at relatively little cost in terms of cognitive capacity or effort. As Rosch (1978) aptly puts it, "The task of categorization is to provide maximum information with the least cognitive effort" (p. 28). In contrast, individuation will almost inevitably involve attending to and integrating the implications of a variety of attributes and attribute conjunctions, precluding a simple reliance on pre-computed, pre-chunked knowledge. However, the information gain accruing from the application of categorical knowledge is likely to be accompanied by a *loss* of individuating information that is not relevant to stereotypic expectancies. When we think of stereotypes as simplifying heuristics or tools for cognitive efficiency, we are emphasizing the fact that the full complexity of the individual person, with his or her various social identities and personal qualities, is reduced to a single identity dimension. We fully agree with Spears and Haslam that stereotypes may well result in a gain of information by allowing perceivers to go beyond the information available and make a set of potentially rich assumptions about a group member's characteristics, motivations, and proclivities. In fact, the "information gain" and "cognitive effort" sides of the efficiency equation have always held equal importance in theories of stereotype efficiency (Allport, 1954; Brewer, 1988; Bruner, 1957; Fiske & Neuberg, 1990; Lippmann, 1922; Tajfel, 1969). Nevertheless, a stereotype-based impression is still a simplification in that it is very likely to involve a substantial loss of idiosyncratic personal information. Thus, stereotypes can both enrich and impoverish social perception.

Spears and Haslam question the notion that stereotypes are precomputed impressions that can be efficiently retrieved and applied, arguing that such a view implies much more rigidity in the stereotyping process than seems warranted. The self-categorization theory view, in contrast, emphasizes the dynamic and context-dependent nature of stereotyping. We certainly agree that the outcome of the stereotyping process is likely to be influenced by the social context, but this does not mean that there is no stable stereotypic representation that can be easily and efficiently retrieved from memory and applied to a stimulus person (Sherman, 1996). All one needs to assume is that activated stereotypic representations can be elaborated and modified in terms of the information available in the immediate context. However, to the extent that this elaboration is an effortful process, it may be compromised by the imposition of a cognitive load, and social perceptions may well look more rigidly stereotypic and less context-sensitive under conditions of substantial cognitive constraint.

Perhaps the most provocative aspect of Spears and Haslam's (1997; see also

Oakes & Turner, 1990) critique is their argument that it is wrong-headed to think of individuation as being inevitably superior to stereotyping. From the standpoint of self-categorization theory, it makes sense to rely on stereotypes in an intergroup situation because, according to the theory, all group members are presumed to be interchangeable with one another in such a context. Thus, in this case, there is no point to individuation, and there is no *a priori* reason why individuation should be considered superior to stereotyping. However, the problem is that the categorization chosen in a particular setting may not always be especially functional or appropriate. For instance, if two persons in a doctor's office define and interact with each other principally in terms of the social categories "doctor" and "patient", this situation may well be the most appropriate, meaningful, and functional arrangement. But what if the doctor is an African-American, and what if the patient invokes stereotypes implying that the doctor is not competent to provide treatment? Is this the most appropriate, meaningful, and functional state of affairs? It would hardly seem so. Thus, there are clearly some circumstances where stereotyping is appropriate and others where it is a cause for concern. In any case, for present purposes, the primary question is not whether stereotyping is inferior to individuation but rather whether it is more efficient. We believe it is.

LOAD EFFECTS ON DIFFERENT STAGES OF THE STEREOTYPING PROCESS

If we want to understand the effects of cognitive load on stereotyping, it is necessary to decompose the stereotyping process into its constituents. A fairly uncontroversial decomposition would go something like this:

1. *Categorization*—identification of the category membership of the target person.
2. *Stereotype activation*—activating the specific mental content associated with the category.
3. *Stereotype application*—using activated content to construe the target person.
4. *Individuation and/or stereotype inhibition/correction*—relying on individual-level rather than group-level attributes in forming an impression and/or attempting to prevent or undo stereotype application.

The most basic prediction concerning cognitive load, as we have argued, is that it will tend to interfere with effortful, resource-dependent mental processes. As such, whether it will impede any of the processes that are relevant to stereotyping will be a function of the extent to which a given process is in fact resource-dependent (Bargh, 1989, 1994).

Of all the processes identified above, categorization has been seen as the most likely to occur rapidly, efficiently, and without conscious intention—perhaps unavoidably (Bargh, 1999; Brewer, 1988; Fiske & Neuberg, 1990). These characteristics fit the criteria of automaticity (Bargh, 1989), and we might therefore reasonably expect that categorization should be impervious to the imposition of a cognitive load. In contrast, Spears and Haslam (1997) argue that categorization is actually a relatively effortful part of the perceivers' quest for meaning, and they present some evidence that when sufficiently extensive cognitive loads are imposed, memory for the category identities of stimulus persons is impaired. To make this case, they employed the name-confusion paradigm (Taylor, Fiske, Etcoff, & Ruderman, 1978) in which participants listen to a multi-person conversation and then have to remember who said what. The rate of within-category errors (i.e., confusing two different members of the same category) is taken to be an index of categorization, and it did indeed decline when comparing high load vs. medium load participants. More recently, however, this conclusion was challenged in a rigorous experiment conducted by Klauer and Wegener (1998), who used a multinomial modeling approach to examine the effects of cognitive load on several components of memory performance in the same "who-said-what?" paradigm adopted by Spears and Haslam. Although cognitive load did impair some aspects of performance, as would be expected, it did not exert any effect at all on a quantitatively precise index of (gender) category discrimination, which was equivalently high across four different levels of cognitive load. Thus, more careful analysis of performance in this paradigm suggests that load in fact does *not* impair categorization. But then again, neither should it. If basic construal processes (e.g., object identification) were disabled through the imposition of working memory loads, life as we know it would grind to a shuddering halt.

Whether or not cognitive load impairs stereotype activation has been a matter of interesting debate in recent years. In an influential paper, Gilbert and Hixon (1991) argued that cognitive load can indeed prevent stereotype activation from occurring. Some of the participants in their experiment were given a cognitive load while they watched a videotape of an Asian woman turning a set of cards containing word fragments that the participants were asked to complete (e.g., __ I C E). Other participants were not under load while performing the task. The word fragments were such that many of them could be completed either with words stereotypically associated with Asians (e.g., "rice") or with words not associated with this group (e.g., "dice"). The number of stereotypic completions was taken as an index of stereotype activation. Although participants in both groups were equally accurate in identifying the ethnicity of the card-turner (again suggesting that the process of initial categorization is impervious to the imposition of cognitive load), it was the non-loaded group that showed evidence of greater stereotype activation.

Gilbert and Hixon concluded, therefore, that stereotype activation does indeed require some attentional resources, and without them, it is unlikely to occur.

Subsequent research suggests that this conclusion requires some qualification. A critical feature of the experimental setting devised by Gilbert and Hixon may have been the fact that the target person (i.e., the card-turner) was completely irrelevant to the perceivers' immediate processing goals. Studies conducted by Macrae, Bodenhausen, Milne, Thorn, and Castelli (1997) and Spencer, Fein, Wolfe, Fong, and Dunn (1998) suggest that stereotype activation is more a function of the perceiver's goals than of the availability of cognitive resources. For example, in a close replication of Gilbert and Hixon's experiment, Spencer *et al.* (1998) found that even cognitively loaded participants activated target-relevant stereotypes, but they did so only if this activation could serve their momentarily salient goal of boosting self-esteem (via downward comparison with another group). Specifically, participants who received negative but not positive feedback following a bogus intelligence test demonstrated stereotype activation upon subsequent exposure to an Asian or African-American target even though they were cognitively loaded.

The evidence is most abundant concerning the role of load in stereotype application. The influence of stereotypes on social judgments is quite consistently more evident when participants are placed under a cognitive load (e.g., Blessum, Lord, & Sia, 1998; Bodenhausen, 1990; Bodenhausen & Lichtenstein, 1987; Gilbert & Hixon, 1991; Gordon & Anderson, 1995; Harris & Perkins, 1995; Kim & Baron, 1988; Kruglanski & Freund, 1983; Macrae *et al.*, 1993; Macrae *et al.*, 1994; Martell, 1991; Pendry, 1998; Pendry & Macrae, 1994; Pratto & Bargh, 1991; Rothbart *et al.*, 1978; Van Knippenberg, Dijksterhuis, & Vermeulen, 1999). As previously noted, the most common interpretation of these effects lies in the assumption that whereas categorization, stereotype activation, and stereotype application all occur in a relatively automatic manner, individuation is more resource-dependent and is thus compromised by the introduction of a cognitive load. As a result, top-down, category-based aspects of the social perception process proceed unhindered, while bottom-up, person-based aspects are impeded. There is another possible account for these effects, however. It may be that, whereas perceivers often spontaneously undertake to inhibit or correct for the influence of stereotypic inferences, this process is, like individuation, relatively effortful. As a consequence, it should also be impeded when one's cognitive load is high. Confirming this possibility, Macrae, Bodenhausen, Milne, and Ford (1997) showed that the ability to intentionally forget stereotypic information was significantly hampered when a cognitive load was present. In related research, Wyer, Sherman, and Stroessner (2000) showed that participants with full capacity were able to avoid applying a stereotype that had been activated unintentionally (via thought suppression) to a subsequent judgment task. In contrast, participants placed

under a cognitive load during the judgment task did apply the suppression-activated stereotype, despite their apparent desire to avoid its influence. Thus, the dominance of stereotypes in the impressions of persons whose attentional resources are taxed is likely to be due both to the relative difficulty of individuation and of stereotype avoidance under these circumstances.

LOAD EFFECTS ON THE PROCESSING OF STEREOTYPE-CONSISTENT AND -INCONSISTENT TARGET INFORMATION

To this point, our analysis of stereotype application has focused on the relative weights given to category-based and individuating information when processing resources are depleted. We have presented both theoretical and empirical arguments that the relative contribution of stereotypes to social judgments is greater under conditions of reduced capacity. From this analysis, one might be tempted to conclude that stereotypes and individuating information exert separate and independent influences on social perception. Of course, this is not the case. Rather, stereotypes and individuating information mutually influence and constrain one another. The influence of stereotypes on the processing of stereotype-relevant information has been particularly thoroughly investigated. This research has shown that the effects of cognitive loads on stereotype application extend beyond direct effects on judgment processes, influencing the encoding, representation, and retrieval of individuating information. Beyond demonstrating these basic effects, this research has also helped to further delineate metatheoretical issues surrounding the use of stereotypes by specifying the particular mechanisms through which stereotypes confer efficiency on the information processing enterprise.

Stereotypes as Filtering Devices

The influence of stereotypes on the processing of stereotype-relevant information has been understood primarily from the perspective of schematic filter models of memory (Minsky, 1975; Neisser, 1976; for reviews, see Alba & Hasher, 1983; Brewer & Nakamura, 1984). According to these models, schemas (including stereotypes) act as mental frameworks that facilitate the encoding, representation, and retrieval of information that is consistent with the schema. In contrast, information that is inconsistent with a schema will be particularly unlikely to be successfully encoded, represented, and retrieved. Thus, schemas act as filters that let in information that confirms people's expectancies and keep out information that disconfirms them.

Two different varieties of schematic filtering have been described in the

stereotyping literature. The first describes a comprehension advantage enjoyed by consistent over inconsistent information. Specifically, because consistent information fits with prior expectancies, it will be more easily understood than inconsistent information that does not meet expectations. This conceptual advantage for consistent information is particularly evident when processing capacity is diminished. Due to the conceptual framework provided by the stereotypical expectancy, consistent behaviors may be well comprehended even when resources are depleted. In contrast, an imposition of a cognitive load significantly impairs a person's ability to extract the meaning of unexpected events. Accordingly, the encoding, representation, and retrieval advantages for consistent information should be particularly acute under low-capacity conditions (for reviews, see Sherman, in press; Sherman *et al.*, 1998).

The second variety of schematic filtering that has been described involves the attentional filtering of consistent and inconsistent information. According to this argument, filtering goes well beyond basic comprehension processes. In particular, because consistent information is easier to encode than inconsistent information, perceivers will actively direct their attention toward consistent and away from inconsistent information, particularly when resources are low and the conceptual advantage for consistent information is greatest. Because inconsistent information is so difficult to encode, perceivers will avoid it when resources are low. This hypothesis is based, in part, on the cognitive miser analysis that people generally prefer to do as little work as necessary. It is also based on principles of selective exposure (e.g., Frey, 1986), which suggest that people prefer to not attend to information that challenges their beliefs, particularly if they do not have the resources to counter-argue that information. Thus, for reasons of sloth and defensiveness, attentional filtering produces strong encoding, representation, and retrieval advantages for consistent information under conditions of limited capacity (for reviews, see Sherman, in press; Sherman *et al.*, 1998).

Stereotypes as Versatile Tools: Encoding Flexibility

More recently, Sherman and his colleagues have proposed an alternative to these models, suggesting that stereotypes are much more versatile tools than crutches or filters (Sherman, in press; Sherman & Frost, 2000; Sherman *et al.*, 1998). According to the "encoding flexibility" model, social perception is often driven more by concerns for efficiency than it is by concerns for sloth or defense, and perceivers seek to maximize the amount of information gained for the effort expended. As such, processing is not wholly biased toward either consistent or inconsistent information when resources are depleted. Rather, in different ways, stereotypes promote the encoding of both consistent *and* inconsistent information under such conditions. Stereotypes facilitate the

encoding of consistent information by providing explanatory frameworks that render that information easy to interpret. This corresponds to the comprehension aspect of filter models. However, the encoding flexibility model argues that this conceptual fluency of consistent information has a very different impact on the encoding of consistent and inconsistent information than do filter models. In particular, it is argued that, because it can be understood with relatively little effort, substantial attention is not devoted to encoding consistent information, particularly when resources are scarce, and the need for efficiency is maximized. Under such circumstances, once the basic gist meaning of consistent behaviors is extracted, there is no need to expend scant resources on carefully encoding their details because they merely confirm what was already expected. Instead, those resources are redirected to aid in the processing of other information, including inconsistent behaviors, which are particularly difficult to understand under such circumstances. This does not mean that the inconsistent behaviors will be fully understood, only that the effort will be made.

The conceptual advantage for consistent information is also argued to influence the extent to which the perceptual details (e.g., specific physical features) of consistent and inconsistent behaviors are encoded. Past research has shown that the availability of a schematic framework may inhibit the perceptual encoding of schema-consistent stimuli (e.g., Johnston & Hawley, 1994; Levy & Kirsner, 1989; MacLeod, 1989; von Hippel, Jonides, Hilton, & Narayan, 1993). This suggests that there should be greater perceptual encoding of stereotype-inconsistent than -consistent behaviors. Given the expected redirection of attention from consistent to inconsistent information when resources are low, this effect should be at least as strong, if not stronger, under conditions of limited capacity. Thus, when capacity is depleted, conceptual encoding favors consistent information, whereas attentional allocation and perceptual encoding favor inconsistent information. As such, stereotypes do not merely simplify social perception for lazy and defensive perceivers. Rather, they permit the flexible distribution of resources in a way that maximizes the amount of information gained for effort expended.

Load Effects on Attention and Encoding

Recently, Sherman *et al.* (1998) reported evidence consistent with the predictions of the encoding flexibility model. In a series of experiments, participants with or without a cognitive load were asked to form an impression of a target person described as a "skinhead" or "priest". Load was induced by requiring participants to rehearse an eight-digit number as they formed their impressions. Both loaded and unloaded participants were instructed that they would be asked to report their impressions at a later date. The information presented included stereotype-consistent and -inconsistent behaviors. The first three

experiments, using three different measures, demonstrated that greater attention was paid to inconsistent than consistent information when resources were depleted. Expt. 1 measured the amount of time participants spent reading consistent and inconsistent behaviors. The results showed that participants with full capacity spent an equal amount of time reading consistent and inconsistent behaviors, whereas participants under a cognitive load spent more time reading inconsistent than consistent behaviors. Expt. 2 measured the amount of attention paid to consistent and inconsistent behaviors with a dual-task paradigm. As participants were reading the behaviors, occasionally the computer emitted a tone. Participants were instructed to respond to the tones by pressing the space bars on their computers as quickly as possible. The amount of time it took them to respond to the tones was used as a measure of attention. The more attention participants are devoting to the information on their screens, the more time it will take them to respond to the tones. Results showed that unloaded participants responded to the tones equally quickly, regardless of whether they occurred during consistent or inconsistent behaviors. By contrast, participants under a cognitive load responded more slowly to tones that occurred during inconsistent than consistent behaviors, indicating that they were attending more carefully to the inconsistent behaviors (see Table 5.1).

Expt. 3 forced participants to attend selectively to either consistent or inconsistent information by presenting consistent and inconsistent items in pairs for a very brief period of time. The results showed that, when there was no cognitive load, participants in a subsequent recognition test recognized consistent and inconsistent items from a pair equally well. However, when there was a cognitive load, the inconsistent item in the pair was recognized with significantly greater accuracy than the consistent item. This shows that attention actually shifted from consistent to inconsistent items when resources were depleted.

Experiments 4 and 5 examined the perceptual and conceptual encoding of stereotype-consistent and -inconsistent information (Sherman *et al.*, 1998). In both experiments, after reading about the target person, participants engaged in a priming task that measured either perceptual (expt. 4) or conceptual

Table 5.1 Tone reaction times as a function of item stereotypicality and cognitive load

	Item stereotypicality	
Cognitive load	Consistent	Inconsistent
Low	300	308
High	337	357

Numbers indicate reaction times in milliseconds.

(expt. 5) encoding. This task required participants to identify words that were flashed very briefly (33 ms) on computer screens. The perceptual priming task examined the extent to which participants could identify words that had appeared in the original stimulus items, but were unrelated to the gist meaning of the items (e.g., the word *salesgirl* from the phrase, "Swore at the salesgirl"). Participants' ability to identify these words reflects the extent to which the perceptual details of the items had been extracted during encoding. In contrast, the conceptual priming task examined the extent to which participants could identify words that reflected the gist meaning of the original stimulus items, but had not actually appeared in those items (e.g., trait terms, such as "kind" and "mean"). Participants' ability to identify these words reflects the extent to which the gist meaning of the items has been extracted during encoding (for a methodological overview, see Roediger, 1990).

Expt. 4 showed that perceptual encoding was greater for inconsistent than consistent behaviors, whether the behaviors were encoded with or without a cognitive load. Expt. 5 showed that, in the low-load condition, conceptual encoding was equally strong for consistent and inconsistent behaviors. In contrast, in the high-load condition, the conceptual meanings of consistent behaviors were more likely to be extracted than the conceptual meanings of inconsistent behaviors. Thus, despite the attentional and perceptual encoding advantages for inconsistent information when resources were depleted, conceptual encoding favored consistent information under such conditions.

These five experiments provide strong initial support for the encoding flexibility model of stereotyping. When resources are limited, stereotypes facilitate the encoding of both stereotype-consistent and -inconsistent information. Inconsistent information receives greater attention and more thorough perceptual encoding. However, despite these advantages, conceptual encoding favors consistent information in these same conditions. These results further inform the debate surrounding the appropriate meta-theory with which to describe stereotype use. They argue for an efficiency-motivated rather than a lazy or defensive perceiver. In particular, perceivers rely on stereotypes to facilitate the encoding of certain kinds of information, so that they may attend to and encode other kinds of information, including information that violates their expectancies. In this way, stereotypes help to maximize the amount of information gained for effort expended.

There are three other important points to make about these findings. First, they make clear that the meaning-enhancing and efficiency-conferring functions of stereotypes are perfectly compatible. Indeed, they are intimately related. When capacity is low, stereotypes enhance meaning by providing conceptual frameworks for understanding the environment. Yet, it is this very conceptual advantage that frees up resources that may be applied to other tasks at hand, including the encoding of inconsistent information. Thus, information gain and effort expenditure are two sides of the same coin.

Second, we do not wish to suggest that cognitive loads will always influence the processing of consistent and inconsistent information in this way. In the aforementioned experiments, it is likely that perceivers were motivated to form accurate impressions of the targets. This enhances the value of carefully encoding unexpected information. However, we certainly believe that in other contexts perceivers may be more motivated by sloth or the desire to defend their beliefs. In these circumstances, perceivers may rely on the conceptual fluency of consistent behaviors as a cue to attend more carefully to those behaviors to the exclusion of inconsistent behaviors. In this way, stereotypes are truly flexible tools that may be adapted to the current needs of the perceiver. Whereas, previously, it was presumed that cognitive loads determine the processing goal (i.e., even accuracy-motivated perceivers were thought to become lazy or defensive when resources were depleted), we argue instead that cognitive loads simply determine how an already-chosen goal will be pursued. The load constrains the perceiver's options, and suggests the most appropriate use of the stereotype tool.

Third, the relationship between stereotyping and individuation appears to be more complex than has previously been suggested. The most prominent models of stereotyping have suggested that increases in stereotype use are associated with decreases in individuation, particularly in the amount of attention paid to and the encoding quality of inconsistent information (e.g., Brewer, 1988; Fiske & Neuberg, 1990). However, Sherman *et al.* (1998) showed that decreases in processing capacity increased both stereotyping and certain individuating processes at the same time. In particular, the conceptual processing advantage for consistent over inconsistent information was evident in the high- but not low-load condition, suggesting an enhanced influence of the stereotype when resources were depleted. At the same time, the attentional advantage for inconsistent over consistent information was also evident in the high- but not low-load condition, suggesting greater individuation when resources were depleted. There was also a perceptual encoding advantage for inconsistent information in the high-load condition. These data suggest that stereotype use and individuation should be conceived as two separate but related continua, rather than as mutually exclusive processing modes. Moreover, movement along the two continua may proceed along different dimensions of encoding at the same time. Thus, stereotyping may be increased via one aspect of encoding (e.g., conceptual processing), while individuation is simultaneously increased via a different mode of encoding (attention; perceptual processing).

Of course, relative encoding of consistent and inconsistent information aside, the overall impact of all types of individuating information is likely to be disrupted by a cognitive load to a greater extent than is the direct application of stereotypical knowledge. As alluded to above, there are many theoretical and empirical arguments to support the claim of increased stereotype

dominance over individuating information when resources are scant (see also Bodenhausen *et al.*, 1999). Yet, some recent research suggests that, in certain circumstances, the impact of inconsistent information may be greater under conditions of cognitive load. Using sub-typing paradigms, both Moreno and Bodenhausen (1999) and Yzerbyt, Coull, and Rocher (1999) have recently demonstrated greater stereotype change in response to counter-stereotypical information under high- than low-load conditions. The authors argued that inconsistent behaviors that might otherwise have been discounted as situational oddities could not receive this sort of attributional processing when resources were diminished. As a result, participants were forced to accept the information at face value and change their stereotypes accordingly. However, given the enhanced direct effects of stereotypes under cognitive load as well as the enhanced conceptual advantage for consistent over inconsistent information in these conditions, it seems unlikely that depriving people of attentional capacity and exposing them to counter-stereotypical targets will prove to be a panacea for stereotyping. Nevertheless, specifying the conditions under which such effects may be obtained promises to be an important question for future research.

Load Effects on Explicit Memory: Recall vs. Recognition

Given the effects of cognitive loads on the initial encoding of consistent and inconsistent information, one might reasonably expect variations in attentional capacity to influence perceivers' ability to intentionally remember this information, as well. In fact, this has been shown to be the case. However, the nature of these effects is more complex than initial research suggested, and depends on the particular measure of memory that is used.

A number of researchers have shown that, whereas inconsistent information is recalled as well or better than 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; Sherman & Frost, 2000; Stangor & Duan, 1991; Stangor & McMillan, 1992). These findings were often taken as evidence that, when resources are low, inconsistent information is neither attended to very carefully nor encoded very thoroughly. However, such an interpretation is problematic because recall is not a clear indicator of how well expectancy-relevant information has been encoded and represented. Recall performance 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 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 consis-

tent over inconsistent information, even if the two kinds of information have been encoded equally thoroughly (for reviews, see Sherman & Frost, 2000; Srull, 1984). 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). 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).

In contrast, recognition tests of memory minimize these retrieval effects (for reviews, see Sherman & Frost, 2000; Srull, 1984). Because test items are presented directly to participants along with foil items, they need not retrieve the to-be-remembered information. Rather, they must simply decide which items are old, and which ones are new. Recognition tests also minimize expectancy-driven response biases by providing a means for mathematically removing the influence of such biases. By removing the influence of expectancy-based retrieval advantages and response biases, tests of recognition memory more clearly assess the extent to which information has been thoroughly encoded and represented in memory (i.e., encoded well enough to discriminate from non-encountered information).

Another important difference between recall and recognition measures is the extent to which each is sensitive to conceptual vs. perceptual encoding. Recall performance is highly sensitive to variations in conceptual encoding, but is relatively insensitive to perceptual encoding. In contrast, the ability to accurately discriminate old from new information is benefited by the extraction of both conceptual meaning and perceptual detail (Johnston, Dark, & Jacoby, 1985; Johnston, Hawley, & Elliott, 1991). However, to the extent that conceptual gist is encoded to the exclusion of memory for specific details, recognition accuracy may suffer (e.g., Graesser, 1981).

Based on the reasoning of the encoding flexibility model outlined above, and based on the differential task demands of recall and recognition tests, Sherman and Frost (2000) predicted that cognitive load would influence recall and recognition of consistent and inconsistent information in opposite ways. In particular, whereas the conceptual gist of consistent information is extracted relatively well under conditions of limited capacity, that information is neither attended to very carefully nor are its perceptual details well encoded. This suggests that, although this information will be well recalled, it will be poorly recognized compared to inconsistent information under such conditions. In contrast, inconsistent information is attended to more carefully and receives more thorough perceptual processing under cognitive load, but is at a conceptual disadvantage. This suggests that, although this information will

not be recalled so well, it will be recognized with greater accuracy than consistent information in these conditions.

Results confirmed these predictions (Sherman & Frost, 2000; see also Sherman *et al.*, 1998). Under conditions of limited capacity, consistent information was recalled better than inconsistent information but recognized with less accuracy. In contrast, consistent and inconsistent items were recalled and recognized equally well when participants had full processing capacity. These results suggest that the recall advantage for consistent information under cognitive load is not due to the more thorough encoding of consistent information. Rather, it likely reflects differences in the ease of retrieval of consistent and inconsistent information in the different conditions (for a complete discussion, see Sherman & Frost, 2000). In fact, the recognition results along with the previously described findings pertaining to attention and perceptual encoding suggest that inconsistent information is more thoroughly encoded and represented than consistent information when resources are low.

Each of these effects has important implications for stereotyping. The fact that consistent information is more accessible than inconsistent information means that, to the extent that judgments are based on memory for a target's behaviors, judgments will be more stereotypical following loaded encoding conditions. The fact that consistent information is more poorly recognized than inconsistent information means that perceivers will be relatively susceptible to falsely attributing stereotypical behaviors to a person that he/she did not perform. When encoding conditions are poor, perceivers may be relatively willing to attribute any stereotypical behavior to a person, so long as the behavior is consistent with the gist of an overall stereotypical impression. The implications for eyewitness testimony are clear, and are further examined in the research described below.

Load Effects on Metacognitive Processes

On occasion, people must go beyond discriminating between events that did and did not occur. Sometimes we know that an event occurred, but we must further determine the particular context in which it occurred. That is, we may need to distinguish between multiple times, places, or participants that define the details of the event. For example, an eyewitness to a brawl outside a bar may have to decide whether it was the Black or White defendant who wielded a switchblade. Such tasks have been termed "source monitoring" tasks by Johnson and her colleagues (e.g., Johnson, Hashtroudi, & Lindsay, 1993), and require perceivers to make attributions about the sources of remembered events. Broadly speaking, such attributions may be accomplished in two ways. First, perceivers may engage in a systematic, effortful search through the details of their memories for evidence implicating one or another source. Thus, our eyewitness may run through the events of the brawl over and over in an

attempt to retrieve relevant information. Alternatively, perceivers may rely on less resource-dependent heuristic processes that point to a particular source. For example, feelings of familiarity or pre-existing expectancies about source may be relied upon in making these attributions (Banaji & Greenwald, 1995; Jacoby, Kelley, Brown, & Jasechko, 1989; Johnson *et al.*, 1993). As such, our eyewitness may simply rely on a stereotype that Blacks are more aggressive than Whites as a basis for determining the carrier of the switchblade. Source monitoring may rely on both systematic and heuristic processes concurrently. However, because heuristic processes require fewer resources than systematic processes, situations that constrain a perceiver's processing capacity may increase the extent to which source attributions are based on heuristic cues (e.g., Jacoby, Woloshyn, & Kelley, 1989). Thus, stereotypes may be especially likely to be used as source monitoring cues when attentional resources are constrained.

This hypothesis was tested in an experiment by Sherman and Bessenoff (1999). First, participants were asked to memorize a list of behaviors, some of which were kind, and some of which were unkind. Afterwards, they read a second list of behaviors that described a skinhead or priest. This list also contained some kind (stereotype-consistent for priests; -inconsistent for skinheads) and unkind (-consistent for skinheads; -inconsistent for priests) behaviors. Following a 24-hour delay, participants were given a source monitoring recognition task. They were presented with the behaviors from the first list and the second list, as well as a set of new kind and unkind behaviors that had not been presented at all on the first day of the experiment. Participants were instructed to push the "yes" button for an item only if it described the target person they had read about. If the behavior was either from list 1 or was a new behavior (list 3), they were instructed to press the "no" button. As they performed this recognition task, half of the participants were also given a cognitive load with the eight-digit rehearsal task described above. Interest focused on the extent to which participants misattributed stereotype-consistent and -inconsistent behaviors to the target when he had not actually performed them.

The results showed that, for the new (list 3) items, misattributions for consistent and inconsistent items were equally likely in both the high and low cognitive load conditions (see Table 5.2). Overall, such misattributions were rare because participants could easily tell that these items were not familiar from the first day of the experiment. Results for the list 1 items showed that participants relied on their stereotypes as cues in the memory task, and misattributed more false consistent than inconsistent behaviors to the stereotyped target. Because the proper source of these behaviors was difficult to discern under these conditions, participants relied on their stereotypes as judgmental cues (see also Banaji & Greenwald, 1995). However, an interaction with the cognitive load variable demonstrated that this effect was found only when

Table 5.2 Proportion of misattributions as a function of item novelty, item stereotypicality and cognitive load

	Old items (list 1)		New items (list 3)	
Cognitive load	Consistent	Inconsistent	Consistent	Inconsistent
Low	0.44	0.44	0.13	0.12
High	0.51	0.41	0.11	0.11

participants' ability to rely on episodic memory was impaired by the imposition of the cognitive load. Thus, when participants needed to rely on episodic memory because there was source confusion, but were unable to do so because of the imposed cognitive load, they relied on the stereotype as a heuristic cue in making their source attributions. In contrast, the stereotype was not used as a source cue (i.e., an equal number of misattributions were made for stereotype-consistent and -inconsistent behaviors) when participants possessed full processing capacity, even though source confusion was high. In this case, participants relied on a more systematic analysis of episodic memory to reconstruct the source information about the behaviors and make their attributions.

These results demonstrate that the influence of stereotypes on memory is affected not only by cognitive loads imposed during encoding (as shown in other research), but also by loads imposed during attempted retrieval. When resources are depleted during a difficult memory-monitoring task, perceivers may simply rely on their stereotypes to inform their memory attributions. These results further highlight the different attentional demands imposed by the use of individuating vs. stereotype-based information. Although both types of information were available to participants, when resources were depleted, the extent to which they referred directly to individuating information in making their source attributions was diminished. In contrast, the extent to which participants relied on their stereotypes as source cues was enhanced in this condition. In this case, however, stereotype-based gains in efficiency are clearly offset by costs in source misattributions.

WHAT IS COGNITIVE LOAD?

Of course, in considering the effects of cognitive load on the application of stereotypical thinking, a critical (although frequently overlooked) theoretical question emerges—how exactly is attention diminished and what impact might this have on information processing and its resultant judgmental and memorial products? Simply stated, what does it mean to say that a social perceiver

is resource-depleted or under cognitive load? For example, can perceivers be resource-depleted in different ways, or indeed to different degrees? Just how ubiquitous are the effects of cognitive debilitation on the application of stereotypical thinking? Will the execution of any concurrent task (e.g., digit rehearsal, reciting the alphabet while balancing on one leg) promote an outbreak of stereotyping when perceivers interact with, or think about, others? To understand the complexities of the stereotyping process these issues require clarification, but in posing these questions one also requires a model of attention, a model that can explain the vagaries of dual-task performance in everyday life (Pashler, 1998). The rich insights of recent research on attentional dynamics have largely been overlooked by social psychologists in their quest to unlock the secrets of the stereotyping process, hence relatively little is known about the exact nature of the relationship between attention and stereotypical thinking. So what does it mean to say that a perceiver is cognitively busy?

Resource Theory

For any theory of attention to be successful, it must account for a basic property of mental life—people have a limited capacity for information processing. Early attempts to deal with this issue prompted the emergence of various filter models of attention (Broadbent, 1958). While multiple streams of information may simultaneously compete for entry to the system at any given instant, gating mechanisms (i.e., filters, limited-capacity channels) deny mental access to many of these streams, thereby inoculating the mind from the specter of cognitive overload. Although occupying a position of prominence in the history of research on attention, the problem with filter models was that they raised many more questions than they resolved. To give but three examples, filter models encountered difficulties when attempting to identify: (a) the basis (or bases) of attentional selection; (b) the extent of pre-attentive processing; and (c) where in the sequence of information processing the filter operates (Broadbent, 1958; Cherry, 1953; Deutsch & Deutsch, 1963; Moray, 1959; Norman, 1968; Treisman, 1960). Resource theory emerged, at least in part, in response to these rather vexing problems. According to resource theory, attention can be likened to a reservoir that contains a finite amount of non-specific cognitive resources (i.e., "mental energy"), resources that perceivers allocate to life's daily chores (Kahneman, 1973; Posner & Boies, 1971). Deplete the reservoir for the purpose of executing a particular mental operation and fewer resources are available for any concurrent task that must also be performed—in this way, then, information processing is necessarily limited. Of relevance in the present context is that the theoretical account that most social cognition researchers have endorsed (at least tacitly) in their writings is this hydraulic resource-based model of attention (see Gilbert, 1989; Wegner, 1994).

Notwithstanding its initial appeal, the major problem with resource theory was that it rapidly became apparent that the conception of a unitary attentional reservoir was inaccurate (Navon & Gopher, 1979; Wickens, 1980). Consider, for example, an experiment by Treisman and Davies (1973). In their task, participants were required to detect two simultaneous targets in three different experimental conditions: visual–visual; auditory–auditory; and auditory–visual. The detection tasks (i.e., visual vs. auditory) were calibrated for their overall difficulty and the question of interest was whether dual-task performance would be influenced by the presentation of items in two different sensory modalities (i.e., auditory–visual). If processing capacity really is a unitary resource, then two stimuli should deplete the attentional reservoir regardless of their presentation mode (Kahneman, 1973). As it turned out, however, this was not what Treisman and Davies (1973) observed. Instead, interference was most pronounced in the within-modality conditions, thereby challenging the assumption that processing capacity is a fixed mental resource. Despite difficulties of this sort, researchers were rather reluctant to abandon resource theory and its underlying assumptions. As a result, the reservoir of attention was drained and replaced instead by various smaller pools of specialized processing resources. In the parlance of attention research, single-resource theory was superseded by multiple-resource theory (Navon & Gopher, 1979; Wickens, 1980, 1984).

Multiple Attentional Pools

The gist of multiple-resource theory was that task performance is driven by dedicated pools of attentional resources. Wickens (1984), for example, argued that resources vary as a function of: (a) processing operation (e.g., input or output); (b) stimulus modality (e.g., visual or auditory); (c) information code (e.g., spatial or verbal); and (d) response type (e.g., vocal or manual). According to this viewpoint, then, interference only occurs when two tasks draw upon the same pool of attentional resources. Thus, it is easy to see why many dual-task situations do not result in interference (e.g., singing while hopping); the tasks simply make demands on different pools of attention. Unfortunately, because of its underlying logic, multiple-resource theory inherited all of the limitations of its predecessor. As Logan (1997) has observed, "for many researchers, multiple-resource theory was a step backwards. It complicated predictions and seemed incapable of falsification. It could accommodate any pattern of results: two tasks would interfere with each other if they shared the same resources but they would not interfere if they used different resources" (p. 165). Given these difficulties, multiple-resource theory has attracted considerable criticism in cognitive psychology and is believed by many to be an inappropriate model of attention (Allport, 1980, 1989; Navon, 1984).

Structural Interference and Stereotypical Thinking

As noted repeatedly throughout the present chapter, stereotypical thinking is commonly equated with a reduction in cognitive resources. But what exactly is meant by "cognitive resources" in this context? As invoked in recent social-cognitive theorizing (Chaiken & Trope, 1999), cognitive resources are often construed in a rather vague and undifferentiated manner. The presumption appears to be that some unitary pool of resources underlies the performance of all efforful cognitive operations, but, as we have noted, this assumption may be unwarranted (Logan, 1997; Pashler, 1994). If it is not resource depletion *per se* that prompts a reliance on schematic thinking, why is it that stereotyping is exacerbated under conditions of divided attention? Fortunately, recent developments in cognitive psychology have provided a detailed analysis of the conditions under which dual-task interference might be expected to occur. It is now widely believed that dual-task interference emerges when mental operations share a common processing mechanism. As Pashler (1994) has argued, "some operations require a single mechanism to be dedicated to them for some period of time. When two tasks need the mechanism at the same time, a bottleneck results, and one or both tasks will be delayed or otherwise impaired" (p. 221). Thus, the basis of task interference is structural similarity rather than resource depletion *per se*.

The value of a structural analysis of dual-task interference lies in the fact that researchers must identify the processing operations that are needed to perform each task. If these operations are structurally similar (i.e., share a common mechanism of processing stage), then interference ensues. This account of dual-task interference is important as it demands a level of process specificity that is often absent in work on stereotyping, particularly research that endorses a resource model of attention. Through a detailed specification of the cognitive mechanisms that support stereotyping, researchers will ultimately gain a broader theoretical understanding of this important phenomenon.

In a recent article, Macrae, Bodenhausen, Schloerscheidt, and Milne (1999) pursued such an analysis of interference effects in stereotyping. As previously noted, one important function of stereotypic expectancies is to sensitize the perceiver to unexpected information, sometimes leading to advantages in the encoding, representation, and recollection of that information. These advantages, particularly in the recollection of unexpected information, depend on two key mental processes. First, upon recognizing the inconsistency of sober Scots or honest politicians, perceivers need to make sense of the situation by resolving the discrepancy between prior expectations and current actualities (Hastie & Kumar, 1979). In addition, they need to be able to remember that the encountered individual does not conform to available stereotypic expectations. In other words, they must individuate the target, organizing their memories around the individual's personal identity, rather than in terms of his or

her superordinate group memberships. But how exactly do perceivers do this? Macrae *et al.* (1999) speculated that these two crucial processes of person perception (i.e., "inconsistency resolution" and "individuation") come under the purview of executive cognitive functioning. According to current thinking, the term "executive function" can be used to characterize a series of higher-order cognitive operations that are involved in the planning, execution, and regulation of behavior (Baddeley, 1996; Goldman-Rakic, 1998; Shallice & Burgess, 1998). Where memory function is concerned, these executive operations coordinate the ongoing activities of working memory by determining which specialized systems should be activated at any given time and how the products of these systems' operations should be integrated and combined (Baddeley & Della Sala, 1998).

If inconsistency resolution and individuation are indeed executive cognitive operations, then they should only be susceptible to impairment or disruption under dual-task conditions that are known to promote executive dysfunction (see Baddeley, 1996). That is, interference should only emerge when the tasks demand simultaneous access to a single processing mechanism. When concurrent activities do not challenge executive operations in any way (i.e., the tasks are structurally dissimilar), attentional depletion should not obstruct the implementation (and products) of these processes. These are precisely the effects that Macrae *et al.* (1999) reported in a series of experiments. Under conditions of executive impairment, perceivers' recollective preference for unexpected information was eliminated, they were no longer able to organize their memories of others in an individuated manner, and they were unable to identify the source of their recollections, particularly when these recollections were counterstereotypic in implication (Johnson *et al.*, 1993). When attentional depletion did not obstruct executive functioning, however, none of these effects emerged. These findings are theoretically noteworthy because they confirm that it is not attentional depletion *per se* that obstructs inconsistency resolution and individuation (Dijksterhuis & van Knippenberg, 1995; Macrae *et al.*, 1993; Pendry & Macrae, 1994); rather, it is executive dysfunction that impairs perceivers' ability to process unexpected material about others. Thus, to understand the conditions under which dual tasks are likely to exacerbate stereotyping, one must have a detailed analysis of the cognitive processes that are involved in the tasks under consideration. Only when the tasks are structurally similar (i.e., processing bottlenecks are created) should stereotyping be increased (Pashler, 1994, 1998).

SUMMARY

We opened this chapter with a quote from Mandler on the ubiquitous influence of limited attentional capacity on thought and action. Our review shows

that this influence certainly extends to the use of stereotypes in social perception. Variations in processing resources affect the use of stereotypes at each point in the social perception process where stereotypes may have an influence. From the initial categorization of a person into a social group to the activation and application of group-based stereotypes, to attempts at stereotype inhibition, decreases in attentional capacity enhance the influence of stereotypes relative to that of individual-level target information. Cognitive loads also affect the manner in which individuating information is attended to, encoded, and remembered. Social perception strategies are constrained by the availability of processing resources, and, clearly, stereotypes are a useful tool for effectively coping with such situational demands.

However, in highlighting the role of attentional capacity in stereotyping, we do not wish to suggest that the need for cognitive economy is the only or even the most important determinant of stereotyping. Certainly, a variety of other goals (e.g., accuracy motivation, identity-related motives, ego defense, justification of the status quo, self-presentation) are also key factors in stereotyping. One of the main implications of our review is that a more thorough analysis of the ways in which these different processing goals interact is sorely needed. Based on the accumulating data, we reject the notion that there is one default goal that subsumes all others. For example, capacity-strapped perceivers do not necessarily default to lazy or defensive processing strategies, as suggested by cognitive miser and filter models of stereotyping. We also reject the idea that the different motives are necessarily incompatible with one another. In particular, the drive for cognitive economy may be pursued independently of other goals that the perceiver may have. Thus, there is no inherent conflict between seeking accuracy or meaning and seeking efficiency. Likewise, there is no conflict between ego-defensive and efficiency motives. Regardless of the desired endpoint of processing, getting there efficiently must be a concern, particularly when resources are depleted. In this way, the need for cognitive economy may be considered not so much a processing motive as a fact of life. It simply presents itself as an obstacle to the perceiver, and stereotypes are one useful tool for dealing with that obstacle, providing a beneficial ratio of information gained to information lost and effort expended. However, we would emphasize once again that the use of stereotypes to achieve efficiency in these situations does not imply the domination of a particular goal. Rather, stereotypes are flexible tools that promote efficiency in the pursuit of whatever goal the perceiver happens to have. It will be up to future research to delineate the particular means and mechanisms by which stereotypes facilitate the attainment of different goals (e.g., what kinds of information are gained and lost, and how so), and how the availability of attentional capacity influences these processes.

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