Annu. Rev. Psychol. 2000. 51:93–120


# SOCIAL COGNITION: Thinking Categorically about Others

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**Key Words** automaticity, inhibition, memory, stereotypes, person perception

■ **Abstract** In attempting to make sense of other people, perceivers regularly construct and use categorical representations to simplify and streamline the person perception process. Noting the importance of categorical thinking in everyday life, our emphasis in this chapter is on the cognitive dynamics of categorical social perception. In reviewing current research on this topic, three specific issues are addressed: (*a*) When are social categories activated by perceivers, (*b*) what are the typical consequences of category activation, and (*c*) can perceivers control the influence and expression of categorical thinking? Throughout the chapter, we consider how integrative models of cognitive functioning may inform our understanding of categorical social perception.

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## INTRODUCTION

In order to successfully propel their owners through complex and demanding social environments, minds must be equipped with two complementary cognitive skills. On

0084–6570/00/0201–0093$12.00 

the one hand, they must sensitize perceivers to the invariant features of their immediate stimulus worlds. To behave in a purposive manner, perceivers must possess stable internal representations (i.e. mental models) of the environments in which they operate (Johnson-Laird 1983, Johnston & Hawley 1994, McClelland et al 1995). Knowing what to expect—and exactly where, when, and from whom to expect it—is information that renders the world a meaningful, orderly, and predictable place. On the other hand, however, to guide behavior in a truly flexible manner, minds must also be responsive to the presence of unexpected (i.e. novel, surprising) stimulus inputs (Baars 1997, McClelland et al 1995, Metcalfe 1993, Norman & Shallice 1986). An adaptive mind, after all, is one that enables its owner to override automated action plans and produce novel behavioral outputs as and when these responses are required. That minds routinely achieve this level of cognitive flexibility is one of the acknowledged triumphs of mental life. As Johnston & Hawley have argued, ''[o]pposing biases toward both what is expected and what is least expected are among the most adaptive and revealing features of the mind'' (1994:56). But how, exactly, is this flexibility attained and what implications does it have for a range of issues in person perception?

According to recent developments in the cognitive neurosciences, flexible processing is believed to be attained through the operation of two complementary mental modules: the neocortical and the hippocampal learning/memory systems (see McClelland et al 1995). The neocortical system (i.e. slow-learning system) comprises people's generic beliefs about the world (i.e. semantic memory), beliefs that accumulate gradually through repeated exposure to particular stimulus events. Given the need for stability in people's perceptions of the world, the contents of the neocortical system (e.g. beliefs, expectancies, norms) are highly resistant to modification or change. The hippocampal system (i.e. fast-learning system), in contrast, serves a different function in mental life in that it enables perceivers to form temporary representations of novel or surprising stimulus events, representations that commonly gain access to consciousness (i.e. episodic memory). Generally speaking, these episodic traces exert little impact on the status of generic knowledge, unless of course they are activated on a regular basis. Then, through a process of consolidation, they are passed to the neocortical system where they have the power to update or modify a perceiver's knowledge base (McClelland et al 1995).

There are good reasons why the mind requires the operation of two independent processing systems. As schematic knowledge (i.e. neocortical system) provides the cognitive backdrop against which the stimulus world is construed, it would be problematic if these mental contents were susceptible to modification following a single surprising experience. Under such conditions, purposive action would be a desirable though unattainable behavioral goal. At the same time, however, perceivers must also be able to respond rapidly and adaptively to novelty and surprise; indeed survival may depend on this ability (Norman & Shallice 1986, Shallice 1988). It is through the possession of two complementary learning systems that mental functioning is accorded the stability and plasticity it requires if perceivers are to chart a smooth passage through life's potentially turbulent waters (Johnston & Hawley 1994;

McClelland et al 1995; Schacter & Tulving 1994; Smith 1990, 1998; Smith & DeCoster 1999).

Of course, the ability to deal with both expected and unexpected stimulus information is a fundamental requirement of the person perception process (Macrae et al 1999, Sherman et al 1998, Smith & DeCoster 1999, von Hippel et al 1993). While anticipating consistency in the behavior of others, perceivers must also be responsive to the presence of unexpected information, as this material frequently demands the execution of nonstereotyped behavioral responses (see Macrae et al 1999, Norman & Shallice 1986, Shallice 1988). But how does the mind realize these diverse information-processing objectives? The answer lies in the application of schematic knowledge structures (i.e. neocortical system) when perceivers think about, and interact with, others. As Gilbert & Hixon observed "[t]he ability to understand new and unique individuals in terms of old and general beliefs is certainly among the handiest tools in the social perceiver's kit" (1991:509).

Given basic cognitive limitations and a challenging stimulus world, perceivers need some way to simplify and structure the person perception process. This they achieve through the activation and implementation of categorical thinking (Allport 1954, Bodenhausen & Macrae 1998, Brewer 1988, Bruner 1957, Fiske & Neuberg 1990). Rather than considering individuals in terms of their unique constellations of attributes and proclivities, perceivers prefer instead to construe them on the basis of the social categories (e.g. race, gender, age) to which they belong, categories for which a wealth of related material is believed to reside in long-term memory. Of course, it is also through the activation of categorical thinking that perceivers are sensitized to the presence of unexpected information. After all, one can only be surprised by a person's behavior if one has prior expectations about how that individual should behave. Thus, in one way or another, categorical thinking provides the flexibility (i.e. stability/plasticity) that the person perception process demands (Macrae et al 1999, Sherman et al 1998).

Once implemented, categorical thinking can shape person perception in at least two important ways. First, perceivers may use the activated knowledge structure to guide the processing (e.g. encoding, representation) of any target-related information that is encountered (Bodenhausen 1988). As a result, categorical thinking can exert a profound influence on the nature of a perceiver's recollections of others (Hamilton & Sherman 1994, Srull & Wyer 1989). Second, perceivers may use the contents of the activated knowledge structure (e.g. trait and behavioral expectancies) to derive evaluations and impressions of a target, a process that commonly gives rise to stereotype-based judgmental outcomes (Brewer 1988, Fiske & Neuberg 1990). Acknowledging the importance of these efforts, this chapter emphasizes the cognitive dynamics of categorical social perception; in particular, how expectations drive people's evaluations and recollections of others (see also Bodenhausen & Macrae 1998, von Hippel et al 1995). In reviewing current research on this topic, three specific issues are addressed: (*a*) When are social categories activated by perceivers, (*b*) what are the typical consequences of category activation, and (*c*) can perceivers control the influence and expression of categorical thinking? Throughout the chapter, we

describe how integrative models of cognitive functioning (Johnston & Hawley 1994, McClelland et al 1995, Norman & Shallice 1986) may inform our understanding of the issues addressed herein.

## CATEGORY ACTIVATION

In attempting to make sense of other people, we regularly construct and use categorical representations to simplify and streamline the person perception process. A debate that has dominated recent theorizing about the nature and function of these representations concerns the conditions under which they may or may not be activated when we interact with others (see Devine 1989, Bargh 1999, Fiske 1989, Gilbert & Hixon 1991, Lepore & Brown 1997). Early writings on this issue were quite unequivocal—category activation was believed to be an inescapable mental event. As Allport memorably noted, ''the human mind must think with the aid of categories . . . We cannot possibly avoid this process. Orderly living depends upon it . . . Every event has certain marks that serve as a cue to bring the category of prejudgment into action . . . A person with dark brown skin will activate whatever concept of Negro is dominant in our mind'' (1954:21). Such was the force of Allport's message that few researchers thought it necessary to contest the assumption that category activation is an unavoidable facet of the person perception process. Indeed, this belief served as the hub of conventional wisdom in person perception for almost 40 years. But is it entirely true? Is category activation really an unconditionally automatic mental process? Our attention now turns to a consideration of this important theoretical issue.

### Automatic Category Activation

The term category is commonly used to describe the totality of information that perceivers have in mind about particular classes of individuals (e.g. Germans, plumbers, pastry chefs), and this knowledge can take many forms (e.g. visual, declarative, procedural) (see Andersen & Glassman 1996; Smith 1990, 1998). Once these categorical representations are triggered, of course, so too are their associated cognitive contents. Hence, content accessibility is commonly utilized as an index of category activation (e.g. Dovidio et al 1986, Perdue & Gurtman 1990). This methodological approach derives from related research in cognitive psychology, primarily work on semantic priming (see Neely 1991). If the associates of a particular concept (e.g. nurse) display enhanced accessibility following the prior presentation of a priming stimulus (e.g. hospital), it is assumed that a mental representation of the priming stimulus has been activated in memory (Anderson & Bower 1972, Collins & Loftus 1975). Similar reasoning is applied in person perception, with category activation also evidenced through the heightened accessibility of material following the presentation of a priming stimulus (Devine 1989, Dovidio et al 1986, Lepore & Brown 1997). Just as ''hospital'' primes ''nurse,'' ''drugs,'' and ''illness,'' so too ''librarian'' activates ''shy,'' ''studious,'' and ''responsible.''

By endorsing the view that semantic priming is an inevitable consequence of mere stimulus exposure, social psychologists logically concluded that category activation must also be an unconditionally automatic mental process. As a result, a spate of experiments emerged in which researchers measured the accessibility of categorical contents (i.e. personality traits) following the presentation of a priming stimulus, usually (although not always) a verbal label (e.g. Italian). In one of the earliest studies of this kind, Dovidio et al (1986) presented participants with a priming category label (i.e. black or white), followed by a series of personality characteristics (e.g. musical). The target items were either stereotypic or nonstereotypic with respect to the priming stimulus, and a participant's task was to report, as quickly as possible, whether the item could ever be true (i.e. descriptive) of the primed category. As expected, participants responded more quickly when stereotypic rather than nonstereotypic items were preceded by the priming label, which suggests that the categorical representation was automatically activated during the task (Allport 1954). Notwithstanding this empirical demonstration, however, it is premature to infer the unconditional automaticity of category activation on the basis of these findings. To perform the experimental task, the participants in the Dovidio et al (1986) study were explicitly required to assess the descriptive applicability of the prime-target relationship (i.e. could X ever be true of Y?). By drawing attention to the priming stimulus in this manner, it is not possible to argue that category activation is an unconditionally automatic event, requiring only the registration of the priming stimulus for its occurrence (see Bargh 1994, 1997).

Noting this difficulty with the Dovidio et al (1986) procedure, subsequent investigations of category activation have employed a range of semantic priming techniques (e.g. lexical decision tasks) that attempt to obscure the relationship between the prime and target stimuli. This is typically achieved in one of two ways: Either the priming stimuli are presented below a perceiver's threshold for conscious detection (Devine 1989; Dovidio et al 1997; Lepore & Brown 1997; Macrae et al 1994b, 1995; Wittenbrink et al 1997) or the task instructions are framed in such a way that they conceal any associative relationship between the items (Banaji & Hardin 1996; Fazio & Dunton 1997; Fazio et al 1995; Gilbert & Hixon 1991; Kawakami et al 1998; Locke et al 1994; Macrae et al 1997b, 1998b; Spencer et al 1998). The logic underlying these studies is straightforward. If perceivers are unable to avoid category activation when the triggering stimulus lies outside consciousness or is seemingly irrelevant to the task at hand (Bargh 1990, 1994; Greenwald & Banaji 1995), then this would support the notion that category activation is an unconditionally automatic mental process (Allport 1954, Devine 1989). As it turns out, the available empirical evidence appears to corroborate this viewpoint (Bargh 1999). Presenting perceivers with a priming category label apparently makes them unable to prevent the activation of the corresponding representation (and its associated contents) in memory (Devine 1989, Perdue & Gurtman 1990). But does this really signal that category activation is an unconditionally automatic mental process, at least in the way that Allport (1954) suggested?

On the basis of the evidence presented thus far, there are two grounds for questioning the unconditional automaticity of category activation. First, under empirical scrutiny, most mental operations fail to satisfy the multiple criteria needed to qualify a process as exclusively automatic in character (Bargh 1990, 1994; Logan & Cowan 1984; Wegner & Bargh 1998). Indeed, even prototypic examples of automatic mental processes, such as Stroop and semantic priming effects, fail in this respect (e.g. Logan 1989, Smith et al 1983). It turns out that most automatic operations are controllable to some degree, an observation that daily experience confirms on a regular basis (Logan 1989). Category activation should be no exception to this rule. Second, given Allport's (1954) assertion that category activation follows the registration of a triggering stimulus—specifically, another person—why is it that researchers have typically used verbal labels to investigate this process? If one could assume a symbolic equivalence between words and persons, then clearly this would not be a problematic experimental strategy. In person perception, however, this assumption of symbolic equivalence may be unwarranted (Gilbert & Hixon 1991, Macrae et al 1997b, Zárate & Smith 1990).

Consider, for example, the following scenario. On encountering a dentist, in no sense is one psychologically compelled to categorize the individual as such. Instead, the person could just as easily be construed as female, elderly, Asian, or indeed any other applicable categorization (Bodenhausen & Macrae 1998, Macrae et al 1995, Pendry & Macrae 1996). This is obviously not the case with category labels, however. Once the label has been detected, mental life may demand that its associates are activated (Neely 1991). As Gilbert & Hixon suggested, " . . . to do otherwise would be to fail to understand what one has read" (1991:516). Simply stated, whereas perceivers must make a categorization when they encounter another person, no equivalent processing is required for verbal labels, as the categorization and the stimulus are one and the same thing. It remains unclear, therefore, the extent to which the presentation of verbal labels can inform our understanding of the earliest stages of the person perception process, stages where perceivers must extract a stable construal of multiply categorizable persons (Bodenhausen & Macrae 1998, Brewer 1988, Fiske & Neuberg 1990).

Given these difficulties, recent years have witnessed something of a sea change in research investigating the automaticity of category activation (Bargh 1999). Following trends in cognitive psychology (Logan 1989), current work is motivated by a revised empirical question. Rather than assuming that category activation is an unconditionally automatic mental operation, recent research has explored the possibility that the process may actually be conditionally automatic, occurring only under certain triggering conditions (Bargh 1994, Wegner & Bargh 1998). But if so, what are these triggering conditions?

## Determinants of Category Activation

According to recent thinking on the topic, mere exposure to a stereotyped target may be insufficient to trigger category activation. Instead, activation may only occur under certain precipitating conditions. The impetus for this work came from an influential

article by Gilbert & Hixon (1991). Backed by a revised conception of automaticity (Bargh 1994), Gilbert & Hixon proposed that category activation may be conditional on the availability of attentional resources. Exposing their participants to a videotaped presentation of an Asian card turner, Gilbert & Hixon argued that the attentional demands of the task environment may determine whether or not an applicable category (i.e. Asian) is activated. Drawing a distinction between the activation and application of categorical thinking, Gilbert & Hixon argued that whereas deficits in cognitive capacity increase the likelihood that perceivers will apply previously activated categories in their dealings with others, these same deficits also reduce the probability that perceivers will be able to activate the relevant category in the first place. Their data suggested that although mentally preoccupied participants knew the category membership of the target, they were too busy to activate associated stereotypic content. Spears & Haslam (1997) went even further, suggesting that cognitive load disrupts the very process of category identification. However, this claim was effectively refuted by Klauer & Wegener (1998), who used a rigorous formal modeling approach to decompose the components of performance in a memory task in which participants had to recall which of several speakers had made various comments in a group discussion. Although the imposition of a cognitive load did impair memory performance for certain components of the model, it had no impact on gender category discrimination (i.e. ability to recall correctly the gender of the speaker). Thus, in contrast to Spears & Haslam's (1997) claims, mental load did not interfere with the process of identifying the category membership of social targets.

A number of studies have sought to identify other factors that may moderate the activation of categorical knowledge structures (Blair & Banaji 1996, Lepore & Brown 1997, Locke et al 1994, Macrae et al 1997b, Wittenbrink et al 1997). On the basis of the evidence that has been collected to date, two factors appear to play a prominent role in the regulation of category activation: perceivers' temporary processing goals (Blair & Banaji 1996, Macrae et al 1997b, Spencer et al 1998) and their general attitudes (i.e. prejudice level) toward the members of the category in question (e.g. Lepore & Brown 1997, Wittenbrink et al 1997). In a recent study, for example, Macrae et al (1997b) demonstrated that category activation does not occur under conditions in which the social meaning of a target is irrelevant to a perceiver's current information-processing concerns. In a similar vein, Blair & Banaji (1996) purported to show that the operation of a counterstereotypic processing expectancy can thwart category activation, at least under certain conditions (but see Bargh 1999).

The effects of temporary processing objectives do not stop here, however. Not only can goal states eliminate category activation, they can also promote categorical thinking. Extending Gilbert & Hixon's (1991) findings, Spencer et al (1998) have shown that even resource-depleted perceivers are capable of activating categorical knowledge structures, if such activation can enhance their feelings of self-worth. Category activation thus appears to be goal dependent (Bargh 1994), with its occurrence conditional upon the complex interplay of both cognitive and motivational forces.

In addition to temporary processing objectives, a perceiver's chronic beliefs about others also appear to moderate the activation of categorical thinking (Lepore & Brown 1997, Locke et al 1994, Wittenbrink et al 1997). It is interesting, however, that this observation is at odds with conventional thinking on the dynamics of the categorization process. Based on Devine's (1989) seminal article, it has been widely accepted that both prejudiced and egalitarian individuals activate categories (and their associated stereotypes) to the same degree when they encounter members of stigmatized social groups. Through common socialization experiences, all individuals are assumed to have the same cultural stereotypes stored in memory, stereotypes that are accessed as soon as a group member (or symbolic equivalent) is encountered (Allport 1954, Devine 1989, Dovidio et al 1986). The cognitive difference between humanitarians and bigots is that whereas the former group overrides the automatic effects of category activation by replacing stereotypic thoughts with their own nonprejudiced personal beliefs (i.e. controlled inhibition), the latter group does not engage in such an activity. Thus, differences between the groups emerge only at the level of controlled cognitive processing. Where automatic operations are concerned (i.e. category activation), bigots and humanitarians are believed to be psychologically indistinguishable (see Devine 1989).

But is this strictly true? Some recent research casts doubt on the veracity of this assumption. Unlike their prejudiced counterparts, egalitarians display no evidence whatsoever of stereotype activation when presented with priming categorical stimuli (Lepore & Brown 1997, Locke et al 1994, Wittenbrink et al 1997). In other words, bigots and humanitarians appear to be distinguishable at the level of automatic cognitive operations (cf Devine 1989). The implication of this finding is obvious: Bigots and humanitarians must differ with respect to material they hold in memory about the members of stigmatized social groups, with humanitarians holding substantially less prejudiced beliefs about these groups (Hilton & von Hippel 1996, Wittenbrink et al 1998). Taken together, these findings suggest that category activation is sometimes amenable to control, at least in the sense of being responsive to a perceiver's cognitive limitations, temporary processing objectives, and chronic beliefs about certain social groups.

Notwithstanding the emergence of the view that category activation is a conditionally automatic mental process, doubts have been cast about the solidity of the empirical foundation upon which this claim is based. Variables that seem to qualify stereotype activation in one study have been found to be uninfluential in other studies. For example, whereas some studies suggest that category activation is contingent upon prejudice levels, some researchers (Dunning & Sherman 1997) have found that implicit gender activation (in the form of tacit inferences) is independent of a participant's level of sexism. Recently, Bargh (1999) provided a provocative review of the literature on the conditional automaticity of category activation. Echoing Allport's (1954) belief that social categories are spontaneously activated when a perceiver encounters a group member, Bargh has critiqued the emerging literature that takes precisely the opposite view—that category activation is avoidable under certain circumstances (e.g. Blair & Banaji 1996, Gilbert & Hixon 1991, Macrae et al 1997b).

Noting some methodological and interpretive problems with this research, Bargh has argued that ''the field of social cognition has become overly optimistic about the 'cognitive monster' of automatic stereotype activation. . . . contrary to what research is actually showing, the conclusions drawn from the data have overestimated the degree to which automatically activated stereotypes can be controlled through good intentions and effortful thought'' (Bargh 1999:362). Given the acknowledged perils of stereotypical thinking, Bargh's message is decidedly pessimistic in flavor. But, in the context of category activation, is it entirely correct? Have researchers really overestimated the extent to which category activation is controllable (Fiske 1989), or are there indeed conditions under which perceivers reliably fail to activate social categories and their associated stereotypes?

One notable weakness of the existing research in this domain is that is has tended to rely on verbal stimulus materials (i.e. category labels) to investigate the cognitive dynamics of the category activation process. Indeed, virtually all the empirical evidence that suggests that category activation is an unconditionally automatic process has been collected in studies of this kind (Devine 1989, Dovidio et al 1986, Perdue & Gurtman 1990). While providing experimental expedience, the use of verbal stimulus materials is problematic, as it necessarily obscures the true information-processing puzzle that confronts perceivers when they encounter other people. The issue is one of stimulus complexity. Whereas people are obviously multiply classifiable entities for which a given categorization must be drawn by perceivers, the same cannot be said of verbal labels. Thus, when presented with words and people, the mind is faced with distinct cognitive puzzles, puzzles that may require different information-processing solutions (Gilbert & Hixon 1991, Macrae et al 1997b, Pendry & Macrae 1996). To assume, therefore, that the processing of verbal labels elucidates the manner in which perceivers categorize and construe others may be a dangerous assumption. Thus, whether category activation is a conditionally or an unconditionally automatic process remains open to question and further empirical scrutiny (Bargh 1999, Devine 1989, Macrae et al 1997b, Spencer et al 1998). To clarify matters, additional work will be required in which researchers investigate the construal processes that are implemented when perceivers encounter real people.

Of course, by presenting perceivers with real people, another puzzle arises: How does the mind deal with the problem of multiple category memberships? Suppose, for example, you meet a thin elderly man who is holding a stethoscope and who is introduced to you as Dr. Jones. Such a person clearly offers multiple opportunities for classification. Will he be categorized in terms of his sex, his age, his somatype, or perhaps even his occupation? One possibility is that the target may be categorized in all of these ways and that each of the applicable stereotypes will simultaneously be activated (Kunda & Thagard 1996). This task could be daunting, however, as a large number of the relevant associates may be semantically or affectively incompatible, prompting cognitive confusion and target ambiguity.

In an attempt to resolve this problem, recent research has suggested that category selection may be facilitated through the operation of low-level inhibitory processes

(Bodenhausen & Macrae 1998, Macrae et al 1995, Stroessner 1996; see also Smith et al 1996). When a perceiver encounters a multiply categorizable target, all applicable categories are believed to be activated in parallel, and a competition for mental dominance then ensues (see Gernsbacher & Faust 1991, Neumann & DeSchepper 1992, Tipper 1985). Category salience, chronic accessibility, and goal relevance are factors that confer an activational advantage to particular categories in such a competition (Bodenhausen & Macrae 1998).

But once a particular categorization achieves significant activation to win the competition, a critical question concerns the fate of the losing categories during the struggle for mental dominance. One viewpoint is that these competing categorizations are actively inhibited during the category selection process (Bodenhausen & Macrae 1998). That is, potentially distracting (hence disruptive) categorizations are removed from the cognitive landscape through a process of spreading inhibition (Neumann & DeSchepper 1992). A perceiver's motivational state also seems to play an important role in the active inhibition of social categories. In a provocative demonstration, Sinclair & Kunda (1999) showed that after participants received favorable performance feedback from a black doctor, associates of the category ''blacks'' became significantly less accessible in their minds (compared to negative-feedback and no-feedback conditions), whereas associates of the category ''doctors'' became significantly more accessible. Thus, when motivated to view a black doctor as competent (because he had praised them), participants inhibited the category ''blacks'' and activated the category ''doctors.'' They did just the reverse when the black doctor provided negative feedback, and they were thus motivated to view him as incompetent. Under these conditions, they inhibited the category ''doctors'' and activated the category ''blacks.'' Motivational factors thus appear to be as important in the inhibition of social categories as they are in their activation.

Although exciting, research on the role of inhibitory mechanisms in category activation is still in its infancy. Indeed, it has yet to be demonstrated just how important inhibitory processes may be in shaping critical aspects of the category selection process. If other areas of psychology are to serve as a useful guide, however, inhibitory mechanisms are likely to play a prominent role in person perception. In the same way that inhibitory processes contribute to our capacity to see complex patterns of motion, initiate complex actions, comprehend written text, and select relevant rather than irrelevant objects from a stimulus array (Gernsbacher & Faust 1991, Neumann & DeSchepper 1992, Norman & Shallice 1986, Tipper 1985), so too they are likely to facilitate our ability to categorize others when competing classifications are readily available. A categorization process that operated in any other way would surely not be flexible enough to deal with the myriad demands of everyday life. Thus, in trying to understand the dynamics of the categorization process, it may be necessary to consider how perceptual, cognitive, and motivational forces modulate the excitatory and inhibitory mechanisms that prompt the activation of categorical thinking.

## CATEGORY APPLICATION

If categorical representations are to be of any value in the social perceiver's quest to navigate social life effectively, obtaining satisfactory outcomes with a minimum of pain and embarrassment, then they must not merely be activated, they must also be used. As Gilbert & Hixon (1991) took pains to point out, the two processes are separable, and the nature and determinants of each must be considered independently. In this section, we outline recent research addressing the forms, conditions, and domains of category application.

### Forms of Category Application

The principal function of activated categorical representations is to provide the perceiver with expectancies that can guide the processing of subsequently encountered information (Olson et al 1996). As previously noted, there are two primary ways that expectancies can influence subsequent information processing. First, they can serve as frameworks for the assimilation and integration of expectancy-consistent information, leading the perceiver to emphasize stereotype-consistent information to a greater extent than he or she would have in the absence of category activation (e.g. Fiske 1998, Fyock & Stangor 1994, Macrae et al 1994b,c). At the same time, expectancies also sensitize the perceiver to unexpected data, leading to a greater emphasis on stereotype-inconsistent information following category activation (e.g. Hastie & Kumar 1979, Srull & Wyer 1989). If the available evidence fails to contradict stereotypic expectancies in a clear way, then category activation would be expected to produce an assimilative bias, leading to judgmental and memory effects that are substantially more stereotypic compared to a case in which the same information was presented without category activation (e.g. Bodenhausen 1988). However, if both stereotypic and counterstereotypic information is presented, which kind of information dominates? In the domain of memory, at least, it is clear that counterstereotypic information is most likely to dominate subsequent processing, particularly during impression formation (Stangor & McMillan 1992).

An ability to deal with the unexpected is obviously an essential requirement for successful social interaction. In dealing with surprising social stimuli, such as extraverted librarians and adventurous senior citizens, two mental abilities are of paramount importance. Recognizing the inconsistency confronting them in such instances, social 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 (Fiske & Neuberg 1990), 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? Recent research has speculated that these two crucial processes of person perception (i.e. inconsistency resolution and individuation) come under the purview of executive cognitive functioning (Macrae et al 1999).

According to current thinking, the term executive function can be used to characterize a raft 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 operations coordinate the activities of working memory by determining which specialized systems should be activated at any given time and how the products of these systems should be integrated and combined (Baddeley & Della Sala 1998).

If inconsistency resolution and individuation are indeed executive cognitive operations, then they should be susceptible to impairment or disruption only under dual-task conditions that are known to promote executive dysfunction (see Baddeley 1996). When concurrent activities do not challenge executive operations in any way, 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 recent article. 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 counter-stereotypic 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, Pendry & Macrae 1994); rather, it is executive dysfunction that impairs a perceiver's ability to process unexpected material. These findings can be integrated with work in the cognitive neurosciences that considers how dysexecutive syndrome can impair aspects of cognitive functioning, such as the accuracy of source memory (Johnson et al 1993). In linking these literatures, it may be possible to begin to chart the neuropsychological origins of social information processing (see Klein et al 1996, Klein & Kihlstrom 1998), thereby providing an integrative theoretical account of the process and consequences of categorical thinking in person perception.

So far, we have seen that category application can influence memories in two different ways, depending on whether consistent or inconsistent information is encountered and emphasized in the processing of target information. In the realm of social judgment, research has also focused on a number of interesting determinants of whether category activation will result in judgmental outcomes that are biased in a manner that is consistent with or opposite to stereotypic expectancies. One important determinant is the nature of the judgment being made, in particular whether it relies on an objective response metric (such as judging height in meters or salary in dollars) versus a subjective scale (such as judging height on a scale ranging from 1 to 10, with appropriate anchors). Whereas objective judgments are assimilated to categorical expectancies, subjective judgments often are contrasted against these expectancies (Biernat et al 1998, Biernat & Kobrynowicz 1997, Kobrynowicz & Biernat 1997). This work shows that stereotype application can take an interesting form in the case of subjective judgments. Specifically, judgments of individuals may

be calibrated against a category-specific standard, which shifts the meaning of the subjective response scale. When judging how tall Sally is on a rating scale, the subjective meaning of ''tall'' may be calibrated in terms of expectations that are specific to the category ''women,'' providing an implicit qualification of the judgment (e.g. ''pretty tall, for a woman''). However, when judging how tall Sally is in meters, no such category-specific calibration can occur, because a meter is a meter, regardless of whether it is a man or a woman whose height is being estimated.

Stapel & Koomen (1998) took a different approach to understanding when assimilation versus contrast is likely to result from category activation. Their research showed that assimilation effects are likely to occur when abstract categorical associates (i.e. stereotypic traits) are activated, but contrast effects are the likely result when a category is activated via the presentation of specific category members. They argued that abstract concepts are used as an assimilative framework, whereas specific exemplars typically serve as standards for comparison against which targets are contrasted. Thus, the manner of category activation appears to influence how the category is applied in subsequent judgments.

## Conditions of Category Application

Having described some of the processes through which stereotype application occurs, we now consider the question of when these processes are most likely to be implemented. Based on Lippmann's (1922) functional analysis of categorical social perception (see also Allport 1954), an expansive literature has confirmed that category application is likely to occur when a perceiver lacks the motivation, time, or cognitive capacity to think deeply (and accurately) about others (Bodenhausen et al 1999, Brewer & Feinstein 1999, Fiske et al 1999). Among recent demonstrations of this general idea is additional evidence that judgment becomes more stereotypic under cognitive load (e.g. van Knippenberg et al 1999), as long as there is not a demonstrably poor fit between the categorical expectations and the available target information (e.g. Blessum et al 1998, Pratto & Bargh 1991).

Given that categorical stereotypes seem most likely to be used when mental capacity and motivation are low, it is perhaps not surprising that Gilbert & Hixon characterized stereotypes as ''a sluggard's best friend'' (1991:509). Although consistent with much available data, this viewpoint nevertheless obscures some basic cognitive benefits that a perceiver can accrue from the application of categorical thinking, especially during times of cognitive duress. Perhaps perceivers enlist the services of categorical thinking not because they are inherently lazy but because this mode of thought offers tangible cognitive benefits, such as rapid inference generation and the efficient deployment of limited processing resources (Macrae et al 1994b, Pendry & Macrae 1994, Sherman & Bessenoff 1999, Sherman & Frost 1999, Sherman et al 1998). But if categorical thinking really does promote efficient cognitive functioning, how is this efficiency achieved, and through which processing operations is it realized?

According to the ''encoding flexibility model'' of Sherman et al (1998), categorical thinking is efficient because it facilitates the encoding of both category-consistent and category-inconsistent information when processing resources are in short supply (cf Dijksterhuis & van Knippenberg 1995, Macrae et al 1994b, Stangor & Duan 1991). Following the activation of categorical knowledge structures, expected material can be processed in a conceptually fluent manner (von Hippel et al 1993, 1995), even when a perceiver's attentional capacity is low. Any spare processing resources can therefore be directed to unexpected material, material that is notoriously difficult to process (and comprehend) under conditions of attentional depletion (Dijksterhuis & van Knippenberg 1995, Stangor & Duan 1991). Thus, the benefits of categorical thinking in demanding environments are twofold. First, expected material is processed in a conceptually fluent (i.e. relatively effortless) manner. Second, residual attentional resources are redirected to any unexpected information that is present, thereby enabling perceivers to process (and remember) this potentially important material (Sherman et al 1998).

Of notable theoretical significance is the explication by Sherman et al (1998) of their findings in terms of Johnston & Hawley's (1994) ''mismatch'' theory. According to this account of mental functioning, the mind does not waste valuable attentional resources on familiar (i.e. expectancy redundant) items that can be encoded easily and efficiently through conceptually driven processing. Instead, once expected information has been matched to an existing knowledge structure or template in memory, attention is redirected to the encoding of unexpected or novel stimuli, as these items are potentially highly informative to perceivers (see also McClelland et al 1995). Given the multifaceted ways that categorical representations can promote efficient and effective information processing, especially when processing resources are constrained, Sherman (1999) proposed a ''Swiss Army knife'' metaphor to capture this flexibility. Just as anticipated in the seminal writings of Lippmann (1922), a theoretical focus on cognitive economy continues to yield important insights into the nature of category activation and use.

In addition to the plethora of studies examining the role of cognitive load on category application, other approaches have been taken in attempting to understand the conditions under which activated categorical knowledge is likely to influence social information processing. A variety of motivational states seem to be important. It is fairly well established that accuracy motivation undermines the use of stereotypes in judgment (Fiske 1998). In contrast, category application is significantly enhanced by other motivational states, such as when application can serve an ego-protective function by providing a basis for downward social comparisons (Fein & Spencer 1997). A different perspective on the moderation of category application is embodied in the ''social judgeability'' approach (Yzerbyt et al 1997a, 1998), which emphasizes the idea that metacognitive concerns often dictate whether perceivers will be willing to render category-based judgments of social targets. Specifically, unless perceivers subjectively believe that there is a legitimate informational basis for a stereotypic judgment (whether or not such a basis actually exists), they are unlikely to report category-based assessments. Finally, in a different vein, Levy et al (1998) demon-

strated that whether or not people are likely to apply stereotypes in their judgments of others depends to a considerable extent on whether they hold an ''entity'' theory of human nature. Such a theory emphasizes the notion that the traits possessed by individuals and groups are fixed and enduring. Individuals who endorsed such a view of human nature were substantially more likely to render stereotypic judgments of category members. Research of this sort indicates that a full appreciation of the conditions promoting the application of categorical beliefs must go beyond the traditionally emphasized moderator variables—processing capacity and motivation for effortful analysis—to include a variety of additional motivational and informational conditions.

## Category Application in the Behavioral Domain

Our consideration of category application has so far focused on the domains of memory and judgment. Recently, some particularly adventurous social psychologists have ventured beyond these highly cognitive response domains and have begun to examine motoric behavioral responses following category activation. The importance and interest value of this research resides in its ability to illuminate a fundamental misconception concerning the origins of human action. Specifically, although perceivers routinely attribute the origins of their own actions to the operation of strategic (i.e. conscious, goal directed) mental processes, such attributions may be based on little more than an introspective illusion (Bargh 1990, 1997; Bargh & Gollwitzer 1994; Dennett 1991; Wegner & Bargh 1998). Although it may typically seem as if we are consciously directing our own behavior, the reality of the situation is that frequently we are not. Instead, many of our complex social actions have their origin in the impenetrable and silent workings of the unconscious mind. As Bargh noted, ''many of the processes believed to be the product of conscious intention . . . could in fact be nonconsciously produced; to wit, even the activation and operation of intentions (goals) themselves could occur without an act of will'' (1997:231). The observation that complex social behavior can be driven by preconscious cognitive processes is not, of course, a novel one; this idea has taken central stage in many influential treatments of human action (Bargh 1990, James 1890, Norman & Shallice 1986). The noteworthy contribution of recent research on the topic, however, has been to demonstrate the impact that these implicit forces can have on a range of everyday behaviors (see Bargh 1997). Residing in long-term memory are cognitive structures (e.g. scripts, exemplars) that are believed to specify a host of schema-related behavioral tendencies (Bargh 1990, Bargh & Gollwitzer 1994). Critically, all that it takes for one's behavior to be shaped by these action tendencies is the activation (i.e. priming) of the relevant cognitive representation, and consciousness need play no part in either the instigation or the maintenance of this process (Dennett 1991). Once triggered, action tendencies can guide social behavior in an entirely autonomous manner (Bargh 1997).

Of relevance in the current context, category activation is but one such route through which automatic action can be elicited. Not only are semantic contents (e.g.

personality characteristics) and affective evaluations represented in categorical knowledge structures, so too are a range of associated behavioral tendencies. Once activated, these implicit action tendencies have the power to guide and shape a perceiver's behavioral products (Bargh 1997, Bargh & Gollwitzer 1994). For example, following the covert activation of the stereotype of the elderly, perceivers have been shown to reduce their walking speed to a dawdle (Bargh et al 1996, Dijksterhuis et al 1998). In a similar vein, surreptitiously activating the stereotype of African-Americans has prompted perceivers to emit decidedly hostile nonverbal behaviors (Bargh et al 1996). The logic underlying these effects is straightforward. The essence of behavioral priming is that perceivers adopt the mental and motoric characteristics of primed cognitive representations, and consciousness need play no part in this process—perception can lead directly to action (Bargh 1997, Bargh et al 1996, Chartrand & Bargh 1996, Chen & Bargh 1997, Dijksterhuis & van Knippenberg 1998, Macrae et al 1998b). Even the cognitive abilities of a perceiver appear susceptible to the effects of this kind. Dijksterhuis & van Knippenberg (1998), for example, demonstrated that following the activation of the stereotype of university professors, participants displayed enhanced performance on a test of their general knowledge (see also Dijksterhuis et al 1998). But what exactly are the limits of these automatic effects? Can priming experiences prompt the occurrence of any behavioral outcome, such as an outburst of violence?

Understandably perhaps, demonstrations of automatic priming are a cause for concern when one considers the possible behavioral implications of such a process. This is essentially because these consciously unprovoked effects may promote the occurrence of undesirable or antisocial behavioral outcomes. For example, if the stereotype of robbers were activated, would this prompt a perceiver to go out and buy a shotgun and raid the nearest bank? As it turns out, there is little reason to suspect that behavioral priming manipulations (e.g. category activation) should propel people to commit calamitous personal actions, although this message is arguably obscured in the available literature on this topic. This is not, of course, because these effects play only a trivial role in the causation of action; clearly they are important determinants of human behavior (Bargh 1997). Rather, it is because in a complex mental system, the influence of activated categorical action schemas is constantly tempered by a variety of other mental events, triggered by a combination of exogenous (e.g. environmental cues) and endogenous (e.g. perceiver goals) forces (Macrae & Johnston 1998). At any point in time, it is probable that numerous behavioral schemas will simultaneously compete for the control of behavior, with some action tendencies triggered by internal processes (e.g. goals, rumination) and others by features of the immediate task environment (see Norman & Shallice 1986). Whether or not a specific action occurs will therefore be determined by the relative strengths of the activated schemas, with schemas routinely provoking antagonistic behavioral responses. According to this account, then, behavioral control is a competition between activated schemas, with various environmental cues and inner psychological states either facilitating or inhibiting the elicitation of certain action patterns (Shallice 1988). How much, when, and for whom activated categories shape behavior,

however, are questions that require empirical clarification and theoretical elaboration. Although automatic forces undeniably shape a person's behavioral products (Bargh 1997), the extent (e.g. time course, malleability) and implications (e.g. are people morally responsible for their automatic behavioral outputs?) of these effects have yet to be fully understood (but see Fiske 1989).

## CATEGORY INHIBITION

Having considered the activation and application of categorical thinking, our attention now turns to the equally important issue of category inhibition. As Dovidio & Gaertner (1986) observed, concerns about egalitarianism and fairness toward minority groups have been on the rise in recent decades. Public opinion polls now reveal nearly universal endorsement of the general principles of equal opportunity and equal treatment under the law (Schuman et al 1997). Increased awareness of the dangers of categorical thinking has had several important consequences. In particular, perceivers now attempt to prevent the expression of discriminatory thinking, either because legal sanctions may follow (Fiske et al 1991) or because stereotyping violates their personal standards of fairness and equality (Devine et al 1991). In other words, whether the motivation arises from personal or societal sources, there may be many conditions under which social perceivers desire to avoid the influence of activated stereotypes on their evaluations of others. But just how readily can a perceiver regulate the expression of categorical thinking? Is mind control an attainable cognitive goal?

### The Mechanics of Mind Control

Although mental control is a topic with a venerable past (Freud 1957), recent years have witnessed a resurgence of interest in the question of how perceivers achieve mastery over their thoughts and recollections (Bodenhausen & Macrae 1998, Carver & Scheier 1990, Jacoby et al 1999, Wegner 1994, Wegner & Pennebaker 1993, Wilson & Brekke 1994). Of course, for perceivers to avoid or make adjustments for the possible influence of unwanted mental contents, such as stereotypic thoughts (Monteith et al 1998a), they must first be aware that such influences are a possibility in the first place (Strack & Hannover 1996). If they do not entertain even the possibility that such effects can occur, perceivers will take no steps to avoid or mitigate the resulting biases (Bodenhausen et al 1998, Greenwald & Banaji 1995, Stapel et al 1998). However, when people become cognizant of the potential for stereotypic bias in their reactions toward others, a variety of regulatory procedures can be used. One possible strategy, for instance, is simply to make direct adjustments to social judgments in the direction opposite to that of the presumed bias (e.g. Wegener & Petty 1997, Wilson & Brekke 1994). More ambitious, however, is a second possible regulatory strategy whereby perceivers may actively attempt to prevent stereotypic thoughts and recollections from ever entering into their deliberations (Bodenhausen

& Macrae 1998, Macrae et al 1997a, Monteith et al 1998a). These direct attempts at thought stopping implicate the mechanisms of mental control identified by Wegner and his colleagues in their impressive and influential program of research (see Wegner 1994).

Stopping unwanted thoughts turns out to be a common human goal (Wegner & Pennebaker 1993); consequently, a sizable literature has addressed the process and consequences of mind control. After examining processes of mental control in a variety of domains, Wegner (1994) developed a general theoretical model of thought suppression. The model postulates that when people desire to avoid a certain type of thought (e.g. categorical thinking), this goal is realized by the joint operation of two cognitive processes. The first is a monitoring process that scans the mental environment looking for signs of the unwanted thought. If detected, a second operating process is initiated that directs consciousness away from the unwanted thought by focusing attention on a suitable distracter. Crucially, whereas the monitoring process is assumed to operate in a relatively automatic manner, the operating process is postulated to be effortful and to require adequate cognitive resources for its successful execution. Thus, detecting the presence of stereotypic ideas is a task that can be accomplished with ease, independently of any other demands that are imposed on a perceiver's processing resources. Replacing these thoughts with suitable distracters, however, is an altogether more demanding affair that can happen only when sufficient attentional resources are available (Wegner 1994).

To detect unwanted thoughts, one must keep in mind what it is one is trying to avoid. Thus, the monitoring process must involve at some level the mental activation of the to-be-avoided material. Otherwise, there would be no criterion on which to conduct the search of consciousness. One of the ironic things about mental control that is apparent from this theoretical perspective is that trying to avoid a particular thought may result in its hyperaccessibility (Wegner & Erber 1992). That is, the very act of trying not to think in categorical terms may actually increase the extent of category activation. Of course, as long as perceivers have adequate resources and consistent motivation, the operating process may be able to keep the focus of attention away from the stereotypic material (Wegner 1994). But if a perceiver is cognitively busy, distracted, under time pressure, or indeed if the motivation for suppression has been relaxed for any reason, the hyperaccessibility created by suppression efforts may not be checked by the operating process. Inhibitory efficiency can also be undermined by such diverse factors as depressive affect (Linville 1996) and the cognitive changes associated with aging (von Hippel et al 1999, Zacks et al 1996). If the inhibitory system is compromised, whatever the reason, then the intention to avoid biased judgments and reactions may actually backfire, producing even more of the unwanted reaction than would otherwise have been the case. We now turn to a consideration of the recent literature examining such counterintentional outcomes.

## Ironic Consequences of Stereotype Suppression

Several studies have documented the ironic consequences of stereotype suppression, as manifest in a perceiver's reactions (e.g. evaluations, recollections, behavior) toward stereotyped targets (e.g. Macrae et al 1994a, 1996, 1997a, 1998a; Sherman et al 1997;

Wyer et al 1998). For example, when evaluating a target (i.e. a skinhead), a prior period of suppression can prompt an increase in stereotyping, once the initial inhibitory intention has been relaxed (Macrae et al 1994a, Wyer et al 1998). As is the case with other mental contents (Wegner 1994, Wegner & Erber 1992), it would appear that an explicit instruction to suppress stereotypes can actually serve to enhance the accessibility of this material in memory (Macrae et al 1994a), thereby setting the stage for postsuppression rebound effects. With stereotypic concepts highly accessible and no operating process in place to direct attention elsewhere (Wegner 1994), construals of social targets are driven by stereotype-based preconceptions, often to a degree that is greater than if a perceiver had never sought to suppress the stereotype in the first place (Macrae et al 1994a, Wyer et al 1998). Ironic effects of this kind also extend to a perceiver's recollections of stereotyped targets. Following the cessation of a well-intentioned period of suppression, perceivers display a recollective preference (both in recall and recognition) for the very material (i.e. stereotype-consistent items) they were formerly trying to dismiss (Macrae et al 1996, 1997a; Sherman et al 1997). Finally, rebound effects have also been shown to shape a perceiver's overt behavior toward the members of stereotyped groups, with suppression promoting an increase in discriminatory action (Macrae et al 1994a). Thus, although the road to stereotype avoidance may be paved with good intentions, without consistent motivation and processing capacity these laudable goals may be unsatisfied, indeed even reversed (Bodenhausen & Macrae 1998, Fiske 1989, Wegner 1994, Wegner & Bargh 1998).

Notwithstanding the aforementioned demonstrations of stereotype rebound, doubts remain over the generality of these ironic effects (see Monteith et al 1998a). For example, does the suppression of any stereotype promote rebound and a subsequent increase in stereotyping? One limitation of early research on this topic was that it employed stereotypes that perceivers are not highly motivated to avoid (e.g. skinheads) (see Macrae et al 1994a). Thus, the question remains whether rebound effects would emerge for groups where there are strong personal or societal prohibitions against stereotyping (e.g. African-Americans, women, homosexuals). As it turns out, the evidence on this issue is equivocal. In a recent article, Monteith et al (1998b) revealed that participants with low-prejudice attitudes toward gays were not susceptible to rebound effects (on either overt or covert measures of stereotyping) following a period of suppression. In contrast, suppression did prompt the hyperaccessibility of stereotypes among participants who were prejudiced toward gays.

Further evidence that suppression can increase stereotyping for even socially sensitive groups can be garnered from recent work by Sherman et al (1997) and Wyer et al (1998). In each of these studies, racial stereotyping was exacerbated following a period of suppression. However, a study by Wyer et al (1999) does suggest that people may be more consistent in their efforts to avoid stereotyping highly sensitive social groups. Because consistency of suppression motivation is an important factor in the avoidance of ironic suppression effects, this work does suggest that rebound effects arising from the suspension of suppression motivation may indeed be less likely when a highly sensitive social category is involved. Clearly, further research is required to establish the extent and boundary conditions of stereotype-based

rebound effects. In this respect, several factors are likely to play a critical role in determining the efficacy of the suppression process. For example, whether perceivers are internally or externally motivated to avoid prejudice (Dunton & Fazio 1997, Plant & Devine 1998) and the extent to which they are practiced at suppression (Kelly & Kahn 1994, Wegner 1994) are likely to shape the process and consequences of mental self-regulation.

## Spontaneous Stereotype Suppression

Ambiguity also surrounds the conditions under which self-regulatory processes are initiated by perceivers. Despite growing interest in the topic of stereotype suppression, surprisingly little is known about how and when inhibitory processes are spontaneously implemented. A characteristic feature of much of the available research on this topic is that the intention to suppress a particular thought or impulse is provided to participants by the experimenter in the form of an explicit admonishment not to think about a particular person in a stereotype-based manner (e.g. Macrae et al 1994a, 1996; Monteith et al 1998a; Sherman et al 1997). Although such a strategy offers obvious methodological advantages, it does sidestep a number of important theoretical questions, most notably the spontaneity issue. It is one thing to suppress stereotypes in response to an explicit experimental instruction, but it may be an entirely different matter to do so spontaneously. So when, exactly, does a perceiver attempt to regulate the expression of stereotypical thinking? Insight into the determinants of uninstructed self-censorship can be gleaned from the work of Devine et al (1991) and Monteith (1993). Monteith (1993), for example, has shown that attempts at self-regulation are implemented when a perceiver experiences a discrepancy between his or her internalized standards and actual behavior. When people are committed to egalitarian, nonprejudiced standards and their behavior apparently violates these standards, they feel guilty, experience compunction, become self-focused, and direct their efforts at reducing this discrepancy. That is, having reacted in an ostensibly prejudiced manner, a perceiver implements self-regulatory procedures in an attempt to avoid a potential repetition of the action.

But is the commission of a prejudiced action, or indeed the belief that such an action has occurred, a necessary precursor of stereotype inhibition? Recent research would tend to suggest not (Macrae et al 1998a, Wyer et al 1998). Instead, heightened self-focus (i.e. self-directed attention) would appear to be sufficient to trigger the spontaneous suppression of unwanted stereotypic thoughts (Bodnehausen & Macrae 1998, Macrae et al 1998a). A common experimental finding is that when the self becomes the focus of attention, perceivers are especially likely to behave in accordance with internalized standards and norms (Carver & Scheier 1990). Under these conditions, behavioral self-regulation is governed by the process of feedback control (Miller et al 1960). In feedback control, an existing condition of the system (e.g. "What am I doing?") is compared against some standard or reference value in memory (e.g. "What should I be doing?"). If a discrepancy between these two states is detected, an operating process is implemented in an attempt to get the system back

on track (Carver & Scheier 1990, Miller et al 1960, Wegner 1994). Of relevance in the current context, stereotype suppression is also believed to operate in such a manner. Triggered by situational cues, stereotype suppression does not demand a conscious inhibitory intention on the part of a perceiver (Macrae et al 1998a).

But what are the cues that reliably trigger stereotype suppression? According to Wyer et al (1998), any cue that makes salient social norms (personal or societal) against stereotyping is likely to promote the spontaneous suppression of stereotypical thinking. Thus, task context, the presence of others, and current information-processing goals are factors that are likely to moderate stereotype suppression. How, when, and for whom personal beliefs and situational cues interact to shape stereotype suppression are issues that require empirical clarification. Additionally, most research and theory on category inhibition has focused on cognitive mechanisms to the neglect of the possible role of affective forces. However, a recent model of willpower proposed by Metcalfe & Mischel (1999) suggests that self-regulation typically involves not only ''cool'' cognitive processes, such as the self-regulatory mechanisms embodied in Wegner's (1994) theory of mental control, but also ''hot,'' emotional, and stimulus-driven factors. Application of their hot/cool-system analysis of self-regulation to the problem of category inhibition promises to be a fruitful avenue for future research.

## CONCLUSIONS

Research on the nature of social cognition has proceeded at such an explosive pace that the idea of providing a comprehensive review of recent developments (within the severe constraints placed on this article) was daunting indeed. Whereas other recent reviews have done an excellent job of describing advances that have occurred in our understanding of the affective and social-pragmatic aspects of person perception and social cognition (e.g. Schwarz 1998), we focused our attention specifically on the cognitive dynamics of categorical social perception. Even within this circumscribed domain, it is not possible to consider fully all of the important and interesting developments of the past few years. For example, we have not touched on the highly promising application of the notion of subjective essentialism (Medin 1989) to the domain of social categories. This work suggests that certain social categories (such as gender and race) are seen as representing fundamental divides of the natural world, based on what are perceived to be deep and stable (presumably biological) foundations (e.g. Gelman et al 1994, Hirschfeld 1996, Rothbart & Taylor 1992, Yzerbyt et al 1997b). Categories may not all be alike in their potential for activation and application, nor in the manner in which they are applied, and much more research needs to address this intriguing issue. We have also not explored the related and burgeoning literature dealing with entatitivity, which asserts both that there may often be important differences in the processing of information about groups versus individuals and that groups may vary in their ''groupiness,'' with important consequences for social perception, memory, and judgment (e.g. Campbell 1958, Hamilton & Sherman 1996,

McConnell et al 1997, Yzerbyt et al 1998b). Lamentably, many other valuable topics have been neglected as well. It is surely a healthy sign that there is simply too much good work on social cognition taking place to distill it all into a single brief review.

In the research we reviewed, progress has come in two important forms. First, theoretical coherence is beginning to emerge in a number of areas, especially when theoretical ideas and general principles that have proven to be fruitful in many domains of psychology and neuroscience are brought to bear on related phenomena of social cognition. At the same time, however, accounting for unique aspects of social life poses new challenges for many such existing theoretical frameworks and exposes explanatory gaps that invoke uniquely social concerns and principles. We look forward, with considerable excitement and anticipation, to the development of a truly social neuroscience that attempts to build explanations for social behavior that bridge multiple levels of explanation. Furthering our understanding of the neurobiological, personal, social, and cultural bases of category activation and use in social perception will undoubtedly be a key part of this endeavor, as social psychology enters the new millennium.



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