Social Cognition

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Glossary

Category accessibility The readiness or ease with which a stored category is activated from memory and used to encode stimulus information.
Cognitive heuristics Mental rules of thumb used for reducing complex judgmental tasks to simpler procedures.
Cognitive process The mental operations that are used to make a judgment or engage in behavior.
Concept activation The process of bringing an element of knowledge from long-term memory into preconscious or conscious awareness.
Dual-process models A class of theoretical models that distinguish between a style of information processing that is effortful, deliberative, and controlled, and one that is fast, effortless, and automatic.
Implicit processes Affect-laden associations between cognitive elements that can be automatically activated by an internal or external stimulus.
Schemas Abstract knowledge structures containing the attributes of a stimulus, along with the rules specifying the interrelationships among the stimulus attributes.
Social stereotypes Knowledge structures that contain beliefs and expectations about the attributes of people belonging to specific social groups.

Introduction

The manner in which social information is interpreted, encoded, stored, and retrieved from memory is critical to understanding how we perceive and interact with the social world. Social cognition represents the scientific approach within social psychology dedicated to studying these processes. With its emphasis on the cognitive structures and processes underlying social behavior, social cognition also has much in common with cognitive psychology. However, social cognition is not synonymous with either field. Furthermore, it is not associated with any one theory or tied to any specific area of research. Rather, it examines a wide range of questions about how people form impressions and attitudes and make social judgments and decisions. The following sections sketch the framework of social cognition, discuss its relation to traditional social psychology and cognitive psychology, and consider its origins and intellectual history. Finally, by presenting a selective overview of theory and research in several substantive domains, the last section illustrates how social-cognitive approaches have contributed to an understanding of social behavior.

Social Cognition, Traditional Social Psychology, and Cognitive Psychology

Social–psychological theories have long accorded cognitive processes a central role. However, as cognitive processes are not directly observable and cannot be easily measured, social–psychological research has traditionally inferred the existence of cognitive processes based on overt behavioral data. By using outcome data to explore questions of process, social psychologists employed S–R methodologies to test S–O–R (stimulus–organism–response) models of social behavior. What distinguishes social cognition from this more traditional approach in social psychology is the relatively formal way in which it treats the O's unobservable processes. The major thrust of social cognition research is to provide conceptual models of, and consequently more detailed evidence for, the mediating role of cognitive processes.

To illustrate how social cognition more clearly addresses the 'why' and 'how' behind the relationship between a stimulus and a response, consider research on attitudes and behavior. In one line of research, social psychologists have examined how the amount of experience one has with an attitude object affects the strength of the relationship between attitudes and behavior. This research indicates that attitudes formed on the basis of direct experience more strongly predict behavior than attitudes formed in the absence of such behavioral experience. Typically, researchers only studied the beginning and end of the presumed causal sequence, neglecting questions regarding why experience strengthens the relationship between attitudes and behavior. Subsequent social–cognitive research by Fazio and others has shown that attitudes based on direct behavioral experience are more cognitively accessible – that is, more easily retrievable from memory – than attitudes formed on an indirect basis. Moreover, this research has shown that people who can quickly retrieve their attitudes from memory demonstrate higher attitude–behavior correspondence than those whose attitude retrieval is slower. Therefore, one reason why attitudes based on direct experience better predict behavior is because they are more accessible in memory than attitudes formed via indirect means.

This research illustrates how more direct measurement approaches in social cognition research, compared with traditional social-psychological research, bring the processes that mediate social behavior into clearer focus. By directly incorporating cognitive processes into theoretical models of social behavior, theory and research in social cognition is able to enrich our understanding of the processes that underlie various forms of social behavior.

To be clear, social cognition is not merely the application of cognitive psychology's theories and methods to a social

context. Broadly speaking, cognitive psychology and social cognition use similar methodological tools and share a concern for cognitive representation (structure) and process. Despite these surface similarities, fundamental differences between social and nonsocial cognition do exist. As social psychologists Leonard Martin and Leslie Clark observed, "We do not think about people in the same way that we think about other things." Perhaps most importantly, in social – as opposed to nonsocial – cognition we are simultaneously the perceivers *and* the targets of perception. This fact has important implications for social perception and behavior. For example, research has shown that how we categorize others strongly influences the ways in which we think about them and interpret their behavior. Our impressions of others also directly influence our behavior toward them, which has in turn, been shown to influence their actual behavior. In this way, if I am a female CEO, whether others categorize me as a female CEO, as a woman, or as a CEO likely determines how they perceive and treat me, and consequently, how I come to see myself and behave toward others.

Social cognition also differs from nonsocial cognition in that the former is more highly intertwined with emotion; in the social domain, certainly more so than in object perception, our feelings influence our thoughts and vice versa. For example, research shows that when people feel angry, they are more likely to stereotype others. In a somewhat different vein, research shows that our attributions about the causes of other people's behavior affect the emotions we experience toward them. If we believe that Laszlo failed his chemistry test because he chose to party with his friends rather than study, we may feel anger or disgust toward him. In contrast, if we attribute the failure to illness, we may pity Laszlo.

To better appreciate the work of contemporary social cognition, a brief discussion of its intellectual origins follows.

Historical Background and Intellectual Origins

Social psychologists have always stressed that people are thinking organisms. At the turn of the century, prominent scholars such as James, Cooley, and Mead had already placed a thinking, evaluating self at the center of social–psychological inquiry. Even during the reign of behaviorism, social psychologists continued to accord cognitive constructs a central place in their theorizing. By World War II, an influx of psychological scientists escaping fascism and genocide in Nazi Germany found an intellectual home in American social psychology, with its emphasis on unobservable processes.

Moreover, the war itself dominated the attention of many seminal thinkers in the field. German and American psychologists alike wondered how a nation like Germany could undergo such a massive and rapid 'attitude change' as to blind the German people to the overthrow of humanitarian values and the genocide of millions. Focusing on the powerful Nazi propaganda machine, some social psychologists (e.g., Kurt Lewin) investigated the factors that influence attitude indoctrination and persuasion, while others focused on persuasion as a form of authoritarian compliance. But the Holocaust also brought to the forefront the problems of stereotyping, prejudice, and discrimination that continue to occupy the field today. Thus, the war was instrumental in terms of channeling both cognitively

oriented scientists and phenomena into the newly developing area of social psychology.

Nevertheless, it was not until the early 1970s that social cognition began to emerge as a subfield of social psychology in its own right. As a consequence of the cognitive revolution, researchers studying social perception began to apply experimental psychology's models of human cognition and memory. Developments within social cognition informed and influenced social psychologists' understanding of social behavior – from attribution to stereotyping and from impression formation to persuasion.

Although the subfield of social cognition is relatively young, we can trace its influences to two philosophical orientations: The first, which has been referred to as the *elemental* perspective, focuses on how different pieces of information are combined to form organized cognitive structures. The second, which has been termed the *holistic* perspective, focuses on the subjective nature of perception and on the organizational principles that guide higher-order cognitive and perceptual processing.

Within the elemental school, associative network models early on probably had the greatest influence on social cognition. Developed within cognitive psychology in the 1960s and 1970s, these models address two fundamental questions in cognition. First, how do people cognitively represent and organize (i.e., structure) information from the external world? Second, how do we process information that we have perceived and stored? In answer to the first question, associative network models suggest that cognitive structures arise through the pairing or association of cognitive elements in memory. These pairings and associations are based on similarity, temporal or spatial contiguity, and frequency and recency of association. In a similar fashion, further associations and connections can build to form more complex cognitive structures, a process known as 'bottom–up' processing. Structurally, these models posit that verbal propositions represent concepts or nodes in long-term memory and that links represent the relationships between nodes. Associative network models also make important assumptions about the processes that operate on memory structures, such as the metaphor of concept activation. When a concept is encountered in the environment (e.g., when I see a dog), its corresponding memory node is activated. This activation then emanates outward, spreading along the associative pathways to other concepts linked to the activated concept (e.g., the concept of 'attack' may be brought into conscious awareness or may unconsciously affect behavior). The strength of association between concepts or nodes determines the degree to which a given concept activates other linked concepts.

In contrast to the 'bottom–up' perspective of associative network theories, adherents of holistic or 'top–down' notions of cognition emphasize that all the information represented within a given cognitive structure operates as an indivisible cognitive unit. The cardinal axiom of this school is the original Gestalt idea that the whole is more than the sum of its parts. For example, Sir Frederick Bartlett, who emphasized the constructivist nature of social perception, demonstrated that people perceive and remember stimuli as higher-order units, rather than as collections of independent elements. Bartlett's work also foreshadowed important developments in social cognition by proposing that existing cognitive structures provide

interpretive frameworks from which people process new information in the environment. In fact, a major theme of Bartlett's research was that cultural expectations and previous experience often distort social perception. Indeed, as will become evident below, subsequent research has shown that cognitive structures can have wide-ranging effects on perception; they influence the environmental features to which people attend, the manner in which such information is interpreted and encoded, and which information is most likely to be available for later retrieval. In essence, this approach highlights the inherently subjective nature of perception, thought, and memory.

The Structure and Processing of Social Information

One of Sir Frederick Bartlett's long-lasting contributions has been his coining of the term *schema* to refer to the ideas, or cognitive structures, of narratives. Now employed in most modern research, the definition has expanded to include stimuli of a wide variety of entities, including objects, persons, social categories, events, or situations. More formally, it is defined as the abstract generic knowledge about the attributes of any stimulus and about the interrelationships among the stimulus attributes. A stereotype (or schema) about the social group 'scientists,' for example, may contain descriptive information in the form of beliefs, expectations, and knowledge about scientists (e.g., scientists are 'ingenious,' 'unsociable,' 'eccentric,' and 'no fun at parties'). The schema also provides a framework for understanding how the attribute information relates to each other (e.g., 'scientists are eccentric because they are very intelligent').

In addition to providing cognitive representations of stimuli, schemas also guide the processing of subsequent information and facilitate the construction of social reality. Social situations are often ambiguous or contain limited information, and consequently, are open to many interpretations. When information is limited, schemas allow us to 'go beyond the information given' and to make inferences about a given stimulus. Using solely the information that a person is a scientist, people could conclude that that same person is also 'unsociable' and 'ingenious.' These schemas about the attributes of social groups – social stereotypes – can affect what kinds of behaviors we expect from individual members of those groups, thus potentially biasing the interpretation of ambiguous behavior. Such behavioral expectations are often based on visually prominent characteristics such as gender, race, and age. For example, Sagar and Schofield showed that when a Black and a White child engaged in identical ambiguously aggressive behaviors, people viewed the Black child's behavior as more aggressive and the White child's behavior as more playful.

Expectations about others can also influence our own behavior toward others. Gendered schemas about occupations, for example, can lead to further sex segregation of employment by altering expectations about the appropriateness of the occupation for each sex. Indeed, Rudman and Glick found that people who stereotyped men as more assertive and directive and women as more nurturing were more likely to hire men for a masculine managerial job. Perhaps most important, research on behavioral confirmation suggests that schema activation results in self-fulfilling prophesies. Studies have shown that when our beliefs and schemas lead us to perceive others in stereotypic terms (e.g., as an African American) rather than as unique individuals, our behavior (e.g., unfriendly) elicits from them confirmatory behavior (e.g., hostility), thus bolstering our preexisting schemas. This dynamic provides an important insight into the reasons why social stereotypes are so difficult to change.

Another function of schemas is that they allow us to simplify and organize information from otherwise unmanageably complex environments. By taking a 'top–down' approach and inferring information based on category membership rather than learning each individual's personal attributes, we expend less effort and conserve cognitive energy. Observing that people often exert minimal cognitive effort and tend to overrely on schemas, Fiske and Taylor coined the term *cognitive miser*. They argued that people habitually tend to take mental shortcuts, even when they are capable of more careful analytic thought. In addition to schemas, people also overrely on heuristics, or general rules of thumb that allow people to make quick and easy inferences. And like schemas, heuristics can lead to systematic errors. Instead of taking the time to learn base-rate information, for example, people use the availability heuristic to quickly infer the frequency or probability of an event occurring based on how easily it comes to mind (cognitive accessibility). Because people tend to overestimate the probability of more salient or familiar events, a person might overestimate the frequency of deaths that result from something dramatic, like a plane crash over the more common but mundane heart disease. By relying on these mental shortcuts rather than engaging in more analytical thought, people sometimes sacrifice accuracy for the sake of efficiency.

As the role of motivational influences on information processing emerged, social cognition researchers in the 1990s began to view people as *motivated tacticians*. According to this perspective, people are not *always* motivated to exert minimal cognitive effort. In addition to efficiency, other motives (e.g., accuracy, ego defensive, consistency) can affect the cognitive strategies people use when processing social information. The *tactician* component implies a more deliberate choice of processing strategy than suggested by more recent research on unconscious motivations. As a result of research on automaticity and control (see below), social psychologists began to develop models that examined when and how people automatically (and sometimes unconsciously) adjust their motivations, emotions, evaluations, and behavior as a function of adapting to different social environments.

Dual-Process Models

We have discussed how people may default to processing information in a low-effort manner, relying on mental shortcuts in everyday contexts. At other times, however, we take a more effortful, data-driven approach to gathering information. To explain when and why people use one approach over the other, a number of dual-process models have appeared in different subdomains of psychology – attitudes and persuasion, person perception, implicit social cognition. All these models distinguish between two different modes of processing: one that is effortful, deliberative, and controlled, and one that is fast, effortless, and automatic. According to Smith and DeCoster, despite differences in domain, level of specificity,

and underlying motivations, all dual-process models tend to possess three major components: (1) they explain when or how people process information in a 'quick and dirty' fashion; (2) they explain how people process information more extensively when motivated and capable; and (3) they outline the conditions that facilitate shifts between the two modes. Capturing many of the similarities in models across domains, Kahneman recently proposed a two-system model with an intuitive system and a reason-based system, with connections to underlying neural subsystems.

Dual-process models were originally developed to account for impression formation processes and have typically focused on the long-lasting effects of stereotypes, a category-based form of processing that tends to occur automatically. The pioneer dual-process models were Brewer's dual-process model of impression formation and Fiske and Neuberg's continuum model. Both of these distinguish between when people will rely on more individuating pieces of information and when they tend to use stereotypes when forming impressions of others. In general, these models propose that people tend to rely more on individuating pieces of information when they observe inconsistency between the stereotype and a target's behavior, but people otherwise predominantly rely on social categories in making social inferences and judgments.

When forming impressions of others, people's motivations can also affect which mode they rely upon. According to Fiske and Neuberg's continuum model, the motivation to belong encourages people to take a more piecemeal (or data-driven) approach in interdependent situations. When people must work with others to succeed, as on a sports team or military squad, they tend to pay more attention to stereotype-inconsistent information. Learning individuating pieces of information, rather than relying on stereotypes, enables people to better predict others' behavior, and as a result to work more effectively together as a cohesive unit. In addition to interdependent situations, when people want to be accurate or they think they may be held accountable to others for the reasoning behind their judgments, they tend to be motivated to process information more carefully and consciously.

Researchers who study attitudes and persuasion are interested in the different processes by which people make attitudinal judgments based on available information. Introduced at approximately the same time, Chaiken's heuristic–systematic model and Petty and Cacioppo's elaboration likelihood model dominate the field of persuasion. The heuristic–systematic model proposed that people can process information in a heuristic or systematic mode, or both. The heuristic mode involves judgments based on rules of thumb or 'heuristics,' which guide processing, often automatically, but in accordance with various principles that account for when one or the other mode of processing is in play. In the more analytic systematic mode, people exert effort to pay attention to message-relevant information. Likewise, the elaboration likelihood model distinguishes between two routes by which a person can process a message: the peripheral (similar to, but not isomorphic with, the heuristic) and the central route (similar to systematic). As with the HSM, which route a person takes depends on his or her ability and motivation to think carefully about the quality of the arguments contained in the message. For example, if you are deciding whether to buy a Honda or a Toyota and processing information heuristically, you might be particularly persuaded to buy the Toyota because of Cameron Diaz's celebrity endorsement. However, if buying a car is an important decision for you, then you would be more likely to consider such issues as recent recalls, cost, gas mileage, warranty, and environmental impact, more than a celebrity endorsement.

For reasoning about attitudinal judgments, three major motives converge in the attitudes and persuasion literature. These motives correspond to concerns about the self, concerns with rewards/punishments associated with other people, and a desire to form a valid picture of reality. These motives line up nicely with the three included in the heuristic–systematic model (HSM) of persuasion, which affect both the extent and direction of processing: accuracy, defense, and impression motivation. According to the HSM, when driven by accuracy motivation, people should engage in an effortful and unbiased search for judgment-relevant information. The defense motivation, in contrast, can lead people to process information superficially or carefully, depending on which method better serves the self. Striving to defend the self-concept, people may select information that preserves preexisting beliefs about the self. Information that is inconsistent with the self-concept, however, should motivate people to carefully process that information in an effort to discredit it.

Despite the prominence of dual-process models, critics have raised several issues pertaining to the pros and cons of different modes of processing. Most of the criticism has revolved around the theory and research behind Kruglanski's unimodel of persuasion. Kruglanski and colleagues argue that distinctions between the two processing modes are artificial and that both modes operate according to hypothesis-testing and inference. That is, because effortful and automatic processing both rely on 'if–then' syllogistic reasoning, the two 'modes' are qualitatively the same. According to Kruglanski, rules of thumb such as 'if an expert makes this argument, then it must be valid' operate similarly to message-based processing (e.g., if this argument is true, then the proposal must be bad). He further argues that differences in judgments previously observed between the two modes simply correspond to quantitative differences in degrees of processing that have been methodologically confounded in past dual-process research.

However, the main premise of the unimodel – that the two processes are qualitatively the same – does not square with recent neurological findings. In particular, Lieberman's research on X and C systems, identified by functional magnetic resonance imaging (fMRI), indicates that some regions of the brain are associated with effortful processes and others with automatic processes. Further, these neurological differences cannot simply be explained by quantitative differences in the extent of processing, as evidenced by research on people with damage to the hippocampus (an area associated with automatic processing). Smith and DeCoster point out that although people with damage to the hippocampus cannot form new associations with novel stimuli, they nevertheless can apply previously learned knowledge (prior to the damage) to perceive similarities in the stimuli. That is, it seems that they used previously learned heuristics. People without damage to the hippocampus, in contrast, are able to automatically learn new associations from experience, often without conscious awareness.

Implicit and Explicit Processes

Another distinction researchers have made between the two modes involves the emotional component of automatic processing. Gawronski and Bodenhausen made this distinction most clearly in their associative propositional evaluation (APE) model of explicit and implicit attitudes. In typical dual-process fashion, the APE model classifies implicit attitudes as automatic processes and explicit attitudes as more controlled. More specifically, however, Gawronki and Bodenhausen define implicit attitudes or associations as *affect*-laden associations activated automatically by an internal or external stimulus. Importantly, these associations do not depend on whether people believe the association to be valid. A person may have a negative association with people with foreign accents simply because he or she grew up watching a lot of movies with accented villains. This does not necessarily mean that the person believes that people with accents tend to be evil. All that matters for implicit attitudes is that the stimulus automatically activates the affect-laden association. Explicit attitudes or propositions, in contrast, depend on whether a person accepts the belief or evaluation to be true and valid.

Conceptualizing implicit processes at a theoretical level is a relatively easier task than measuring them at an empirical level, given that implicit processes presumably occur automatically and outside of a person's awareness. That said, measures of implicit attitudes and associations have become increasingly popular in the last decade. The most popular of these measures are the implicit association test (IAT) and affective priming tests. The IAT uses a timed computer-categorization task to measure the strength of association between a category (e.g., Black and White people) and an attribute (usually affect-laden like 'good' or 'bad'). For example, a person might first be asked to categorize all Black faces and positive words (e.g., summer, good) with their left forefinger and all White faces and negative words (e.g., bad, vomit) with their right forefinger. Then they would be asked to categorize Black with bad and White with good. Faster responses for the Black-positive/White-negative pairing would indicate a stronger association between Blacks, as compared with Whites, with positive valence. Lending validation to this new tool, a recent meta-analysis revealed that compared to explicit measures (most commonly assessed using self-report), the IAT better predicted socially sensitive criterion variables, such as those related to race or other intergroup relations. For example, a Black–White IAT better predicted nonverbal behaviors such as participants' eye blinking and physical distance between the participant and a Black confederate than the participants' self-report of their feelings toward Blacks.

Based on a similar rationale of associative pairing, Fazio and colleagues developed the affective priming method for measuring implicit attitudes. In this paradigm, a computer quickly flashes a prime (e.g., a man or woman's face) before showing a positive or negative word and then measures the amount of time it takes participants to categorize each word as good or bad. This paradigm is based on the assumption that positive attitudes toward a category like women should increase the speed with which a person categorizes positive words (e.g., summer, smile) as positive. Like the IAT, research on affective priming has found that response latencies after the prime predicted subtle racial behaviors (e.g., eye contact,

blinking, physical closeness). In one study of implicit racial bias, Fazio et al. found that people who categorized negative words more quickly after a Black prime also tended to place more blame on Blacks for the Los Angeles riots that followed the not-guilty verdict for the police accused of beating Rodney King.

Automaticity and Behavior

Automatic processes, such as implicit attitudes, affect many areas of social life. Social cognition researchers have found that subliminal primes can affect behavior and perception by activating mental representations outside of a person's awareness. In one study, Bargh et al. subliminally primed people with either a Black or White face. When the experimenter subsequently told participants that the computer had lost all their data and they would have to repeat the tedious task, participants primed with Blacks exhibited more hostile facial expressions. Automatic processes also occur when someone is consciously exposed to a stimulus, yet unaware that the particular stimulus has any effect on seemingly unrelated behavior or judgments. In another clever study, Bargh et al. had participants unscramble words that primed the category 'elderly.' As a result, participants were aware that they had just seen words such as 'old' and 'forgetful,' but had no idea that these words might affect their behavior in a completely unrelated domain. After the experiment had ostensibly ended, however, they walked more slowly down the hall to the elevator than participants who had unscrambled neutral words.

People also seem to automatically engage in self-protective processes and behaviors when their self-esteem is threatened. Telling people they did poorly on a task (threatening their self-esteem), for instance, tends to increase their negative stereotyping of others. Such research paints a rather bleak picture of the pervasiveness of automatic biases. But, automatic processes do not all have to be negative and, in fact, people can override their negative biases given the motivation and ability to do so. For example, if people are motivated to be egalitarian, then negative stereotyping does not have to occur. If people admit their potential for prejudicial responses and feel guilt over it, they can learn a new association between the problematic category and a warning for careful processing. Over time, and with practice, people can learn to inhibit the negative response and replace it with a more positive one, thus making the positive response the dominant and automatic one.

Social Neuroscience

As mentioned earlier, recent neuroscientific findings have begun to offer convergent evidence of two separate systems in the brain responsible for controlled and automatic processing. The newly developing interdisciplinary field of social neuroscience – still less than two decades old – uses cognitive neuroscience research tools (e.g., fMRI and PET) to examine the neural locations of social information processing. It allows social psychologists to investigate hypotheses – such as whether automatic and controlled processes are qualitatively distinct – using neuroscience methods. Since the beginning of the 1990s, known as the Decade of the Brain, neuroscientific studies have generated a great deal of excitement about a possible window

into the brain. The marriage of these two previously separate fields should not be particularly surprising given that both neuroscience and social psychology are concerned with how the mind works and how affective and cognitive processes connect to action tendencies and actual behavior.

Studies of neurological processes using functional magnetic resonance imaging (fMRI) are increasingly popular, with new data appearing routinely. Part of the appeal of fMRI to social cognition researchers comes from the belief that self-reports and observations of overt behavior provide only a limited picture of the mechanisms underlying complex attitudes and behavior, especially automatic attitudes. Functional magnetic resonance imaging provides images of brain activity by measuring changes in blood flow and oxygen use while people engage in a particular activity (e.g., categorizing faces as male or female, thinking about someone with whom they are passionately in love). These images of brain activity during different tasks provide clues about the possible functions of different regions of the brain, thereby providing another part of the picture of the mechanisms underlying social cognition processes.

Although social neuroscientific findings have contributed to our understanding of social phenomena such as attachment, morality, prejudice, and decision making, we must be mindful that neuroscience is still conceptually and methodologically in a relatively early stage of development. The colorful images depicting brain activity published in magazine articles suggest a deceptively clear and compelling picture of a highly complex and nuanced process. Most research suggests that complex psychological or behavioral constructs do not cleanly map onto a single area of the brain. It is most likely the case that no region of the brain serves one singular function. With these caveats in mind, general themes have emerged in the literature on social–cognitive neuroscience.

Studies have shown, for example, that different areas of the brain are associated with object perception and person perception. The medial prefrontal cortex (mPFC) – located on the outer side of the brain, about one-third of the way back along the midline – seems particularly important for social–cognitive tasks. For example, along with the superior temporal cortex, the intraparietal sulcus, and the fusiform gyrus, the mPFC was implicated in a social judgment task. Compared to object judgment (could the word 'shabby' describe a pair of pants?), social judgments (could the word 'assertive' describe a person named Mark?) were associated with a unique pattern of brain activity in the medial prefrontal cortex. Interestingly, thinking about one's own life and experiences also predicts activation in the mPFC.

As described in the dual-process section, recent neuroscientific evidence provides support for the distinction between controlled and automatic processing, as each kind of processing seems to be associated with different regions of the brain. Lieberman's research indicates that automatic processing is associated with activation in the amygdala, basal ganglia, ventromedial prefrontal cortex, lateral temporal cortex, and dorsal anterior cingulated cortex. To simplify, Lieberman and colleagues refer to the collective of these regions as the X-system. As further evidence of the amygdala's involvement in automatic processing, other researchers have found that activation of the amygdala correlates with implicit measures of racial attitudes, but not explicit measures. Controlled processing, in contrast, seems to be associated with the lateral prefrontal cortex, medial prefrontal cortex, lateral parietal cortex, medial parietal cortex, medial temporal lobe, and rostral anterior cingulated cortex. Lieberman and colleagues refer to these regions as the C-System.

Other neuropsychological evidence supports Baumeister and Leary's contention that the need to belong and connect with others may be a fundamental motive, or at least has a biological association. Simply being excluded from a computerized ball-tossing game has been shown to increase activation of the dorsal anterior cingulated cortex (dACC), the same part of the brain that reacts to physical pain. Activation of the dACC has also been found to be associated with losing important social connections such as caretakers.

All these findings demonstrate that the use of new neuroscientific tools has helped to create an exciting new subfield within social cognition. As our understanding of brain imaging continues to develop, this new research has considerable potential to enrich theory and research in social cognition.

Conclusion

Since our last review more than 15 years ago, the field of social cognition has steadily evolved. Perhaps the two most promising new directions are implicit attitudes and social–cognitive neuroscience. In bypassing an individual's conscious awareness, these theoretical frameworks have the capacity to deepen our understanding of the intersection between social interaction and the workings of the mind. Over the last two decades, social cognition has also contributed to a scientific database that serves the research interests of more applied social scientists. For example, political psychologists have relied on social-cognitive concepts such as priming and framing to understand the dynamics of public opinion. In laying out a theory of *implicit* racial priming in elections, Mendelberg argues that the rise of egalitarian norms in American society requires that campaigns seeking to mobilize resentful White voters use subtle forms of racial communication. Social–cognitive concepts have also informed our understanding of the nature of candidate evaluation. In particular, by noting that voters often extract the evaluative implications of political information at the moment of exposure and then proceed to forget the nongist descriptive details, political psychologists have forcefully challenged the long-standing assumption that rational choice flows from information holding and ideological awareness. In sum, we expect that conceptual and methodological advances in social cognition will continue to serve as the basis for scientific advancements both within and beyond the field of social psychology.

See also: Cognitive Bias; Impression Formation; Motivation; Persuasion; Self-Fulfilling Prophecy; Prejudice, Discrimination, and Stereotypes (Racial Bias).

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