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Automatic Antecedents of Discrimination

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Abstract: In increasingly diverse societies, discrimination against social groups and their members continues to be a public and political concern. Research has addressed three basic cognitive processes that precede discrimination: categorization, stereotype/prejudice activation, and stereotype/prejudice application, suggesting that these processes occur in an automatic fashion. However, there are multiple components of automaticity, including unawareness, efficiency, unintentionality, and uncontrollability. Most of the previous research implies that these components of automaticity converge with respect to cognitive antecedents of discrimination. Here, we review evidence on the distinct components of automaticity in order to assess whether (a) categorization, (b) stereotype/prejudice activation, and (c) stereotype/prejudice application occur (1) without awareness, (2) efficiently, and (3) goal-independently. We highlight evidence indicating convergence or divergence of the automaticity components during each of the processing stages. This analysis provides readers with an up-to-date review that helps to evaluate whether a multi-component approach to automaticity is of additional benefit in aggregating knowledge about the cognitive antecedents of discrimination. We discuss open issues and avenues for future research.

Keywords: automaticity, categorization, stereotype/prejudice activation, stereotype/prejudice application, stereotyping

Encountering a Black person in the subway late at night may induce feelings of threat among White people in Europe or the USA and lead them change to another car, whereas reactions to encountering another White person in the same context might be more positive. Given that one is unfamiliar with both persons, the reactions must result from knowledge stored in memory about Black versus White people in general. The present article is about such differences in perceiving and judging individuals solely because they are members of different social categories.

In the present paper, we will review research on three basic cognitive processes that contribute to social discrimination: categorization, stereotype/prejudice activation, and stereotype/prejudice application. There is now substantial evidence that these processes can operate automatically (e.g., Devine & Sharp, 2009; Ito, 2013). However, there are multiple components of automaticity that have not always clearly delineated in previous work. In particular, processes are automatic if they occur without awareness, efficiently, unintentionally, and uncontrollably (Bargh, 1994; Moors & De Houwer, 2006). Most work on the extent to which categorization, activation, or application occur automatically does not specify which component of automaticity is operating in a particular context. Rather, the general term "automaticity" is often used, regardless of which component is being investigated. The implication is that the different components of automaticity converge and operate in unison. In the present paper, we directly examine this question, systematically reviewing evidence on the converge of different components of automaticity during different stages of cognitive processing. We evaluate whether a multi-component approach to automaticity is of additional benefit in aggregating knowledge about the operating conditions of categorization, activation, and application. We highlight open issues as well as challenges in investigating the automaticity of these processes. Finally, we provide readers with an analytic basis for deriving interventions to prevent stereotypes and prejudice from affecting judgments and behavior.

Cognitive Antecedents of Discrimination

Multiple cognitive, affective, and motivational processes precede and contribute to social discrimination. Prominent
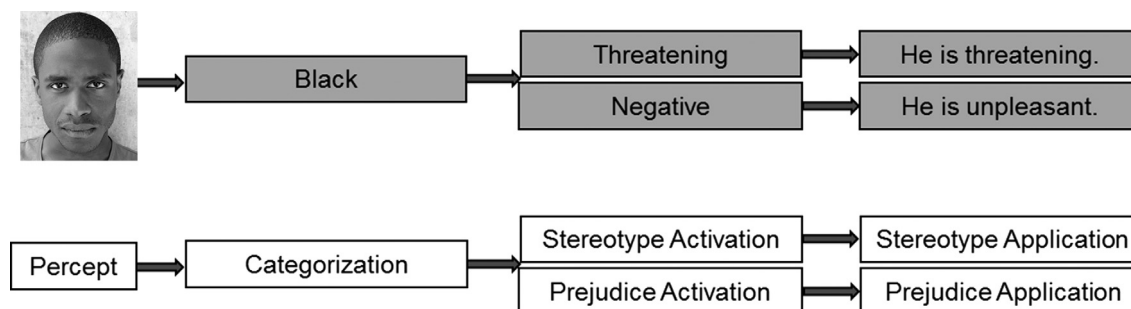
Figure 1. Illustration of the three cognitive processing stages that may cause discrimination.

theoretical analyses (e.g., Brewer, 1988; Macrae & Quadflieg, 2010) propose three broad stages of cognitive processing that may eventually cause discriminatory judgment and behavior (see Figure 1).[1]

First in the sequence, an individual is assigned to a category that defines a social group (e.g., the elderly, men, Blacks; Bodenhausen, Kang, & Peery, 2012).[2] Once *categorization* has taken place, stereotypes and prejudice associated with the category may be activated and become accessible for further processing. According to typical definitions, *stereotypes* contain characteristics about what category members are like, although the possession of these attributes is neither sufficient nor necessary to define the category (e.g., Bodenhausen & Macrae, 1998). *Prejudice* is typically defined as an attitude toward social groups and their members that can be positive or negative (e.g., Dovidio, Hewstone, Glick, & Esses, 2010). In the present literature, activation and application of stereotypes versus prejudice are rarely experimentally distinguished (but see Amodio & Devine, 2006), and most work suggests that they operate similarly in terms of the components of automaticity. Once activated, stereotypes/prejudice may enter judgment and decision-making processes and hence be applied to social perception, judgment, and behavior. There is, however, an important distinction between stereotype/prejudice activation (i.e., mental accessibility) and their application (i.e., the use of activated content during thought and behavior).

People may try (and succeed) to inhibit any of these processes in order to prevent discrimination as an end stage of this cognitive cascade. For example, if the Black person in the subway is initially not categorized as Black, it is less likely that stereotypes/prejudice will be activated. Even if categorization occurs, it is not necessarily the case that stereotypes/prejudice will be activated. If stereotypes/prejudice are not activated upon perceiving the Black person, then they will not influence perception, judgment, and behavior. Even if stereotypes/prejudice are activated, they may not be applied in perception, judgment, and behavior.

The Concept of Automaticity

In recent reviews on stereotyping/prejudice, automaticity is often treated as a homogenous construct (e.g., Dovidio et al., 2010) and is sometimes contrasted with the control of stereotyping/prejudice (Monteith, Woodcock, & Gulker, 2013). However, several theoretical analyses assert that automaticity has multiple components (Moors & De Houwer, 2006); among them unawareness, efficiency, unintentionality, and uncontrollability (Bargh, 1994). *Awareness* broadly refers to the degree to which a person can report that a process took place. A perceiver could be unaware of a person being judged (e.g., in subliminal priming research) or unaware of how features of that target influence how they think and feel about the target. *Efficiency* refers to the degree to which a process draws on central cognitive resources and, hence, is more or less easily undermined in the presence of competing tasks. Thus, an efficient process occurs irrespective of other

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[1] We acknowledge that stereotypes and prejudice toward in-groups can also become activated and applied to in-group members including the self – with problematic consequences (e.g., Martiny, Roth, Jelenec, Steffens, & Croizet, 2012). Nearly all of the research on the distinct antecedents of discrimination however, has focused on how automatic these processes occur with respect to out-group members. It is an important research question on whether the same processes and their operating principles as reviewed in the present article can be generalized to in-group members and the self.

[2] Notably, some research has shown that features (e.g., shape of nose and lips) over and above category information can influence judgments, suggesting that categorization might not be an essential cognitive process preceding discrimination (Blair, Judd, & Fallman, 2004). However, evidence for stereotype/prejudice-consistent judgments that circumvent categorization has been inferred indirectly only. We are not aware of any experiments that allow causal conclusions about whether application can completely circumvent categorization. Therefore, we acknowledge that features may directly translate into application, but for the present review we stick with the common stage model including categorization.

ongoing processes that draw on similar resources. *Speed* is another aspect of efficiency, referring to the time needed for execution of a process (Smith & Lerner, 1986). *Intentionality* refers to the degree to which a process is initiated intentionally. A process occurs unintentionally when the goal of initiating the process is absent, but the process is still operating. Finally, *controllability* refers to the degree to which a process can be stopped or changed when a decision is made to stop or change it. If a process cannot be voluntarily stopped, it is said to be uncontrollable.

Some of the components of automaticity are rarely investigated separately. This is particularly true for the distinction between intentionality and controllability, which may be, in part, due to a lack of methods that can differentiate them (see Teachman, Joormann, Steinman, & Gotlib, 2012). Because intentionality and controllability are both goal-dependent, and because research has rarely distinguished between them, we will summarize the literature under the conjoint term *goal-dependence*. A process is goal-independent when the behavior is consistent regardless of whether there is a goal to initiate or stop it.

A cognitive process may operate without awareness or goals and be efficient. Theoretically, however, these components of automaticity can diverge. For example, some processes are efficient but goal-dependent (e.g., steering a car) or goal-independent but involve awareness (e.g., a muscle reflex). Thus, evidence that a process is automatic regarding one component of automaticity does not implicate that the same process is automatic regarding a different component of automaticity. The present review evaluates the extent to which categorization, activation, and application are to a similar extent processes that occur without awareness or goals and are efficient. A detailed analysis separating the components of automaticity will help to clarify the nature of the cognitive processes that nourish discrimination.

Automaticity of the Cognitive Antecedents of Discrimination

Automatic Categorization

Awareness

At least three lines of empirical evidence indicate that parts of the categorization process can occur without awareness. First, evidence suggests that socially relevant categorizations are influenced by subliminal stimuli (Klauer, Eder, Greenwald, & Abrams, 2007). A second set of experiments has demonstrated that people sometimes are able to intentionally and consciously categorize other people but have little to no knowledge about the perceptual features they

use to come to such categorizations (Rule, Ambady, Adams, & Macrae, 2008). Finally, people's behavior clearly demonstrated that they have categorized others without being aware that they have done so (Stroessner, Haines, Sherman, & Kantrowitz, 2010).

Speed and Efficiency

Studies that assessed the time people need to perform gender, age, and race categorizations observed latencies lower than 600 ms (e.g., Wiese, Schweinberger, & Neumann, 2008). EEG-based measures that provide a more fine-grained time estimate of categorization than tasks that involve behavioral responses show that brain potentials occurring as soon as about 200 ms after stimulus onset may differentially respond to category related features of faces (e.g., Tomelleri & Castelli, 2012).

Experiments that rendered the categorization process more demanding (e.g., by making faces harder to process) have demonstrated that categories are still extracted indicating its efficiency (Macrae, Quinn, Mason, & Quadflieg, 2005; Martin & Macrae, 2010). A second strategy has shown that categorization occurs even when participants' cognitive resources are taxed by a secondary task (Klauer & Ehrenberg, 2005).

Goal-Dependence

Research based on several methods suggests that categorization occurs independently from perceiver goals. In the flanker task (Eriksen & Eriksen, 1974), distracter stimuli (e.g., male or female faces) that surround target stimuli (e.g., male or female faces) influence the speed and efficiency of target-categorizations (e.g., according to gender) despite the fact that participants are instructed to ignore the distracter stimuli (Dickter & Bartholow, 2007). Complementing these observations, evidence suggests that, once a goal to categorize along a certain dimension (e.g., gender) is set for a focal stimulus (e.g., a word in the center of the screen), the category memberships of irrelevant distractor stimuli seem still to be extracted (Macrae et al., 2005; Mason, Cloutier, & Macrae, 2006).

During the who-said-what task (Taylor, Fiske, Etcoff, & Ruderman, 1978) people are presented with statements along with the speaker's photographs that vary in category membership. Afterwards they are asked to assign each statement to the person who made it. Despite the fact that many of the studies in this research tradition draw participants' attention to categories (e.g., by including content related to group issues) which may prompt categorization, the goal to use these categories does not help completing the task. Still, people usually make more within-category errors (e.g., a statement by a Black person is assigned to another Black person) than between-category errors (a statement by a Black person is assigned to a White

person) indicating that at least salient categories affect categorization goal-independently.

Once a face is intentionally categorized (e.g., as male), then performing the same categorization again typically is faster than performing another categorization (e.g., young) – a phenomenon known as repetition priming (Burton, Bruce, & Johnston, 1990). Evidence suggests that repetition priming occurs even for categorizations that were not intended initially (e.g., the social categorization young is also facilitated by a previous male categorization), providing indirect evidence that the unintended categorization previously occurred in parallel along with the intended categorization (Wiese et al., 2008).

A number of studies have observed differential event-related potentials (ERP) reflecting categorization (Ito, Thompson, & Cacioppo, 2004; Wiese et al., 2008) that are independent of goals to categorize targets along the critical dimension. Such differential effects even occurred when participants viewed the faces in the background while scanning the screen for simple objects such as white dots (Ito & Urland, 2005; Tomelleri & Castelli, 2012).

Findings like these provide evidence for the notion that, independent of goals, categories are extracted and affect information processing. However, there also is some contradictory evidence. For example, Quinn and Macrae (2005) failed to observe repetition priming of unintended categories, and Ofan, Rubin, and Amodio (2011) failed to observe differential effects in ERP as a function of the race of target faces. Furthermore, recent research indicates that competing categories can reduce the use of the initial category, particularly when observers intend comparative judgments between the cued categories (Klauer, Hölzenbein, Calanchini, & Sherman, 2014). Thus, although, categories can be extracted independent of goals, in some situations, goals modify categorization (also see Pietraszewski, 2016).

Automatic Activation of Stereotypes/Prejudice

Awareness

There is abundant evidence that category primes (e.g., faces of group members or category labels) presented subliminally influence prejudice/stereotype activation (e.g., Degner, Wentura, Gniewosz, & Noack, 2007; Perdue & Gurtman, 1990). For example, Moskowitz, Stone, and Childs (2012) presented people with category primes (faces of African and European men) for as short as 10 ms. While no subjects reported having seen any face, responses to stereotypical words were faster following the stereotyped group primes than responses to the same words following non-stereotyped group primes. Furthermore, neuroscientific evidence complements the conclusion that

stereotypes/prejudice can become activated without awareness (Cunningham et al., 2004).

Speed and Efficiency

Activation is often inferred from reaction-time-based implicit measures that involve behavioral responses. Results from these measures show that stereotypes/prejudice are often activated in less than a second (e.g., Blair & Banaji, 1996; Payne, 2001). Studies drawing on more fine-grained time-resolved EEG responses toward social stimuli indicate that category-based affective reactions occur by about 400–500 ms after stimulus onset (Ito et al., 2004; Wang et al., 2011; White, Crites, Taylor, & Corral, 2009). Research on expectancy violation indicates that stereotypes/prejudice are activated as early as about 300 ms (Bartholow, Dickter, & Sestir, 2006) or even 100 ms after stimulus presentation (Dickter & Gyurovski, 2012).

Strong evidence for the efficiency of stereotype activation has been provided by research employing the weapon identification task (WIT). During the WIT, people see a face of a Black or a White person followed by a weapon or a tool (Payne, 2001). Their task is simply to identify the object as either a weapon or a tool. Usually, people are faster to identify a weapon when preceded by a Black face than when preceded by a White face. When researchers added time pressure to the decisions in the WIT, results show that (1) parameters of stereotype activation were not affected (Payne, Lambert, & Jacoby, 2002) and (2) stereotype-consistent responses increased (Payne, 2001). Finally, Govorun and Payne (2006) depleted participant's cognitive resources before performing the WIT and showed that stereotype-consistent judgments persisted, nevertheless, indicating that activation is not resource-dependent.

Contradicting this evidence, a few studies suggest stereotype activation to be inefficient. In Gilbert and Hixon's study (1991) participants watched a videotape showing a White or an Asian assistant. Results demonstrated that only participants who were *not* distracted by a second task while watching the video showed stereotype activation. Distracted participants in that experiment did not show activation (also see Spencer, Fein, Wolfe, Fong, & Dunn, 1998).

Goal-Dependence

If results of implicit measures that assess activation could not be altered or faked, this would speak to the goal-independence of activation. However, research shows that responses on implicit measures are sometimes susceptible to faking. Similarly, a variety of motives and goals can affect activation. One line of research suggests that a self-esteem maintenance goal enhanced stereotype activation even under circumstances in which stereotypes were not activated (Sinclair & Kunda, 1999; Spencer et al., 1998).

More research has focused on goals that may counteract activation. Research distinguishes two variants of anti-prejudice or egalitarian motives. People can either be motivated to avoid prejudice because their social environment encourages them to do so (i.e., external motivation) or because they truly endorse and enact egalitarian goals, independent from what others think (i.e., internal motivation; Dunton & Fazio, 1997; Plant & Devine, 1998). Evidence based on physiological responses (Amodio, Devine, & Harmon-Jones, 2008) as well as process dissociation methods (Gonsalkorale, Sherman, Allen, Klauer, & Amodio, 2011) suggest that people with high internal but low external motivation to control prejudice exhibit markedly reduced activation compared to other combinations of internal/external motivation of control (also see Devine, Plant, Amodio, Harmon-Jones, & Vance, 2002; Fehr & Sassenberg, 2010). Similarly, Moskowitz and colleagues' research suggests that chronic as well as temporarily activated egalitarian goals inhibit activation (Moskowitz, Gollwitzer, Wasel, & Schaal, 1999; Moskowitz & Li, 2011).

Research that induced participants to have concurrent goals has shown diverse results. In line with the literature reviewed above, some studies indicate that instructed dissenting-goals reduce or even eliminate activation (Kunda & Spencer, 2003). For example, in Jones and Fazio's study (2010), race-related stereotypes in the WIT were only activated when participants attended to race but not when they were instructed to attend to age instead of race (also see Macrae, Bodenhausen, Milne, Thorn, & Castelli, 1997). Comparable results occurred for prejudice activation when people intended an individuating judgment (whether the person likes vegetables) or when people were merely searching for a dot in the presented face (Wheeler & Fiske, 2005). However, other research that instructed dissenting goals similarly has shown that activation is invariant upon them. Gawronski, Cunningham, LeBel, and Deutsch (2010) instructed participants to either attend to the age or to the ethnicity of target persons that were presented as primes in the affective misattribution procedure (AMP), another implicit measure of bias (Payne, Cheng, Govorun, & Stewart, 2005). Results indicated that prejudice was activated irrespectively of attentional focus, pointing at the goal-independence of activation. Instructing people differently, Payne, Lambert, and Jacoby (2002) observed similar results in the WIT: stereotype activation was invariant across instructions to ignore or to use the category for judgment (also see Imhoff, Schmidt, Bernhardt, Dierksmeier, & Banse, 2011; Payne et al., 2005 for similar findings of these instructions using the AMP).

Finally results derived from the primed lexical decision task (LDT; e.g., Bessenoff & Sherman, 2000) provide evidence for goal-independent stereotype activation. In the LDT, participants are instructed to merely distinguish words from non-words by means of a key-press after having been primed with a category stimulus. The prime stimuli are introduced as irrelevant or even presented subliminally (e.g., Hutter & Crisp, 2008). Still, primes affected the time with which targets were classified as words or non-words. However, temporarily activated egalitarian goals may counteract activation in the LDT and, thus, under conditions that usually are invariant to goals (Moskowitz & Li, 2011).

Automatic Application of Stereotypes/Prejudice

Awareness
Research consistently has shown that stereotype/prejudice application can bypass awareness. For example, Graham and Lowery (2004) subliminally primed police officers with words related to Black people. Afterwards, they were presented with scenarios about a hypothetical adolescent who committed a crime. The scenario did not contain any information about the category membership of the adolescent. Nevertheless, the officers rated the adolescent more negatively, judged him more culpable, and even recommended a stronger punishment when primed with words indicating the category of Blacks than when primed with neutral words (also see Gross & Hardin, 2007). Besides judgments, studies indicated that subliminally priming people with category information led to stereotype-consistent subsequent behavior (e.g., Chen & Bargh, 1997), though recent replication attempts call into question the robustness of such effects (Doyen, Klein, Pichon, & Cleeremans, 2012; Shanks et al., 2013; but see Payne, Brown-Iannuzzi, & Loersch, 2016 for an explanation).

In other research, participants were primed with clearly perceivable stimuli that influenced their judgments about stereotypic and counter-stereotypic traits of a category member but they could not tell about the influence of the prime on their judgments (Higgins, Rholes, & Jones, 1977). These studies imply that activated stereotypes can lead to stereotype congruent judgments even when participants retrospectively indicate that they were not aware of the influence of the priming (Banaji, Hardin, & Rothman, 1993).

Speed and Efficiency
Research that implemented the shooter task has shown that the decision to shoot is faster when a weapon is presented with a Black person compared to a White person. People showed behavioral responses that reflect stereotype application in this simple judgmental task about 550 ms after the onset of a category exemplar (e.g., shoot response after seeing a Black person holding a gun; Correll, Park, Judd, & Wittenbrink, 2002; Correll et al., 2007; for a recent conceptual replication see Essien et al., 2017). ERPs that

may go along with ascribing a stereotypical versus a non-stereotypical trait to a respective category differ at 180–200 and 300–350 ms after activation (Jia et al., 2012). The behavioral responses that indicate stereotype application in that task took about 400 ms after activation.

Ample evidence suggests that stereotype/prejudice application is efficient in that it occurs under time pressure and with restricted cognitive resources. This is at least the case when the situation is ambiguous (e.g., Kleider, Knuycky, & Cavrak, 2012) or when there is a semantic fit between activated memory content and the target's characteristics (e.g., Klauer & Ehrenberg, 2005). Once stereotypes are activated, time pressure and cognitive constraints (e.g., distracting tasks, physical depletion, anxiety arousal) during the impression formation or the application phase increase stereotype/prejudice-consistent perceptions and judgments (e.g., Blair, Judd, & Fallman, 2004; Macrae, Hewstone, & Griffiths, 1993; Wigboldus, Sherman, Franzese, & van Knippenberg, 2004). Further indication that stereotypes affect judgment and behavior under time pressure can be found in research using the shooter task. In line with results on stereotype activation that implemented the WIT, adding time pressure in the shooter task pushes the stereotype-consistent reaction time effect into false stereotype-consistent responses (Correll et al., 2002).

Goal-Dependence
Similar to the evidence on goal-dependent activation, people may want to either increase or reduce the influence of stereotypes/prejudice in their judgments and behavior. If none of these motives affect application, this indicates that application is goal-independent. However, self-enhancement goals intensified prejudice-consistent judgments of out-group members (Fein & Spencer, 1997; Jordan, Spencer, & Zanna, 2005).

Most of the research has focused on the reduction of stereotype/prejudice application. People who were motivated to respond without prejudice (Devine et al., 2002; Dunton & Fazio, 1997), those who were prompted to form an accurate impression of an individual (e.g., Kruglanski & Freund, 1983; Pendry & Macrae, 1994), and those who were instructed to willingly suppress the influence of stereotypes/prejudice in their judgments (Macrae, Bodenhausen, Milne, & Jetten, 1994; Wyer, 2007) were able to reduce their expression of stereotypes/prejudice (also see Krieglmeyer & Sherman, 2012 for goal-dependent stereotype application after activation). Thus, abundant evidence shows that application does not meet the automaticity criterion of goal-independence (but see Blair et al., 2004 for goal-independence of feature-based stereotyping).

However, research has revealed important boundary conditions for goals to reduce application. People were only able to control the influence of stereotypes/prejudice in their judgments when they had time and sufficient processing capacity to implement their goal (Pendry & Macrae, 1994). Research employing the shooter task underlines that motivated counteracting of application depends on cognitive resources: despite being rewarded monetarily for correct judgments in the task, when people were pressed for time, their stereotype-consistent errors increased, indicating that time pressure amplified stereotype application irrespective of goals (Correll et al., 2002). Finally, research indicates that when people willingly suppressed the influence of stereotypes while describing a person, stereotypes became hyper-accessible and were strongly applied thereafter (e.g., Galinsky & Moskowitz, 2007; Macrae et al., 1994; Wyer, Sherman, & Stroessner, 1998). This was particularly true for individuals high in prejudice who were not internally motivated to respond without prejudice (Monteith, Sherman, & Devine, 1998).

Notably, Glaser and colleagues have argued that goals and motives can operate outside of awareness and conscious control (Glaser & Kihlstrom, 2005). They employed reaction-time-based methods (e.g., IAT; Greenwald, McGhee, & Schwartz, 1998) to assess two antecedents (implicit negative attitude toward prejudice, implicit belief that oneself is prejudiced) of what they call implicit motivation to control prejudice. Their research revealed that people high in implicit motivation to control prejudice (those who show at the same time high levels of implicit negative attitude toward prejudice and belief that oneself is prejudiced) showed *less* application of stereotypes the stronger their implicit stereotype was (Glaser & Knowles, 2008). Furthermore, people high in implicit motivation to control prejudice also showed decreased application when their cognitive resources were depleted (Park, Glaser, & Knowles, 2008). This research suggests that people high in implicit motivation to control prejudice show reduced application in an efficient manner. Together with the above reviewed evidence, these findings are interesting because they suggest that different kinds of goals and motivations distinctly affect application more or less depending on cognitive capacity. Whereas instructed goals appear to depend on cognitive resources, goals that are represented in the associative knowledge structure counteract application efficiently. Even though Glaser and colleagues suggest that implicit motivation to control prejudice operates outside of awareness and consciousness, that claim has not yet been investigated. Research showed that people are well aware of their implicit attitudes and can willingly control responses on the IAT and similar tasks (Hahn, Judd, Hirsh, & Blair, 2014; Steffens, 2004). Thus, it is an important avenue for future research to investigate whether motivation can alter stereotype/prejudice application not only efficiently but also without awareness and conscious intent.

Table 1. Summary of published evidence that the three cognitive processing stages occur without awareness, are fast, efficient, and goal-independent

	Processing Stage		
	Categorization	Stereotype/prejudice activation	Stereotype/prejudice application
Automaticity component			
Unaware	Consistent evidence	Consistent evidence	Consistent evidence
Speeded	EEG responses 200–600 ms, behavioral responses < 600 ms	EEG responses 100–500 ms, behavioral responses < 1 s	EEG responses 180–350 ms, behavioral responses 400–550 ms
Efficient	Consistent evidence	Consistent evidence, except of two experiments	Consistent evidence
Goal-independent	Mixed evidence	Mixed evidence	Mixed evidence

Summary

An extensive body of research has investigated the automaticity of cognitive antecedents of discrimination. We began the present review with the question of whether categorization, stereotype/prejudice activation, and their application in judgments and behavior *can* occur without awareness, efficiently, and goal-independently. Certainly, a single true positive result for each of the processing stages would already establish that it occurs in principle without awareness, efficiently, and goal-independently. However, a single positive result could also represent a false-positive finding. Therefore, in the following section, we aim to highlight where there are inconsistent findings in the literature tackling the question whether – based on the published body of evidence – the cognitive processes *typically are* automatic. Table 1 summarizes the results of this review. Notably, this summary cannot be a "proof of existence" it merely demonstrates inconsistencies in the published literature that we aim to highlight. A more conclusive answer to the question about whether these processes typically occur automatically needs a quantitative approach systematically analyzing published as well as unpublished research. Such a comprehensive meta-analysis is still missing from the literature. Given that our review revealed some inconsistencies in the literature, a quantitative approach would be a promising avenue for the research on the automaticity of the cognitive antecedents of discrimination.

Reviewing the literature, we observed that findings converge with respect to the automaticity dimensions (un)awareness and efficiency. All three processing stages have been consistently shown to occur without awareness, in less than one second, and independently of cognitive resources. Notably, an often cited study demonstrated that stereotypes are not activated when people are distracted by a secondary task (Gilbert & Hixon, 1991). However, in sum there is considerable evidence demonstrating the opposite; stereotype/prejudice activation is unaffected when people are distracted or under time pressure. Therefore, we conclude that
the published evidence for efficient activation is consistent, with that exception.

Research also indicates that categorization, activation, and application operate independently from goals. However, there is also evidence that motives and goals alter all of these processes. Thus, the evidence on goal-(in) dependence is the most inconclusive, and more systematic investigation of boundary conditions is warranted.

At least some of the inconsistencies may be accounted for by what is known about how goals affect performance (Locke & Latham, 1990). Among the main moderators specified by goal-setting theory (Locke, 2015) are task complexity, feedback (knowledge of progress), goal commitment, and situational constraints. Drawing on goal-setting theory, some of the contradictory findings, for example, on goal-(in)dependence of stereotype/prejudice activation may be explained by differences in the employed tasks. For example, whereas dissenting categorization instructions altered activation in the WIT, they did not have such an effect on AMP performance. Even though both are priming measures, the tasks are very different: recognizing an object as a tool or gun (WIT) versus evaluating a neutral stimulus (AMP). Additionally, procedural differences of tasks (e.g., different stimulus onset asynchronies, time pressure, feedback on the correctness of responses) may have contributed to diverging findings in previous research (Deutsch & Gawronski, 2009).

Goal commitment may be another crucial moderator explaining when goals affect categorization, activation, and application. Research showed that internal motivation to avoid stereotyping as well as intrinsic egalitarian goals diminish stereotype/prejudice activation. Instructed goals, however, were less consistently effective. There is reason to assume that people are, in general, more committed to pursue intrinsic goals than goals that are extrinsically provided (Latham, Erez, & Locke, 1988). These differences in goal commitment may distinctly affect effort and persistence while performing a task and, thereby, explain inconsistencies among studies that have investigated the influence of goals on categorization, activation, and application.

Whereas goal-setting theory aims to explain performance based on conscious goals, an even more interesting case is goals that may operate unconsciously (Glaser & Knowles, 2008; Moskowitz et al., 1999). Despite widespread evidence that goals alter stereotype/prejudice activation and application only when cognitive resources are plentiful, time pressure is absent, and people consciously perceive cues (e.g., Bartholow, Henry, Lust, Saults, & Wood, 2012; Lambert et al., 2003; Lepore & Brown, 2002), some evidence suggests that egalitarian goals and implicit motivation can reduce activation and application even under time pressure (Moskowitz, Salomon, & Taylor, 2000), when cognitive resources are depleted (Park et al., 2008), and when the target person is not consciously perceived (Johns, Cullum, Smith, & Freng, 2008). Together, the results suggest that distinct goal representations operate under different conditions. Whereas less intrinsic goals may draw on cognitive resources and require awareness, more intrinsic goals may be activated and inhibit activation and application effortlessly and without awareness (also see Huntsinger, Sinclair, Kenrick, & Ray, 2016 for another example). More systematic research is needed to address what kinds of goals operate under which conditions.

Conclusion

Avoiding stereotyping and prejudice in judgments and behavior can be difficult and, in some situations, even impossible because processes that nourish biased responses proceed automatically. The present review highlighted the importance of distinguishing among components of automaticity in research on the cognitive antecedents of discrimination. Despite the immense volume of literature on the automaticity of categorization, activation, application, the present systematic overview highlights that components of automaticity may diverge across and even interactively influence these processes.

We believe that there should be more systematic research specifically on how components of automaticity interact in affecting categorization, activation, and application. We want to conclude with what we have identified as avenues for future research toward this goal. First, research needs to address differences in goal commitment when investigating the effects of goals on categorization, activation, and application. Second, cognitive representations of distinct types of goals (e.g., intrinsic, extrinsic) may differ. A taxonomy of goals that have been investigated in categorization, activation, and application that highlights differences and similarities among goals would be a useful first step. Furthermore, a variety of methods have been employed to tackle people's cognitive resources. Whereas some of these methods distract attention by various means,

other methods add time pressure. A better understanding of how distinct goals affect responding requires a more systematic study of different means of constraining processing resources. Similarly, the cognitive antecedents of discrimination have been investigated with a variety of distinct tasks. As tasks vary along an unspecified number of criteria (e.g., complexity, behavioral response, stimulus onset asynchrony), a systematic examination of these tasks and features would be most welcome. Finally, researchers should be explicit about which component of automaticity they are investigating and about the conditions under which the implemented tasks operate. In conclusion, despite the immense body of literature on the automaticity of cognitive antecedents of discrimination, research has just begun to put together the pieces of the puzzle.

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