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Examining the Relationships Among Categorization, Stereotype Activation, and Stereotype Application

Heather Rose Rees[1], Debbie S. Ma[2], and Jeffrey W. Sherman[1]

Abstract

Increased category salience is associated with increased stereotyping. Prior research has not examined the processes that may account for this relationship. That is, it is unclear whether category salience leads to increased stereotyping by increasing stereotype activation (i.e., increased accessibility of stereotypic information), application (i.e., increasing the tendency to apply activated stereotypes), or both processes simultaneously. We examined this question across three studies by manipulating category salience in an implicit stereotyping measure and by applying a process model that provides independent estimates of stereotype activation and application. Our results replicated past findings that category salience increases stereotyping. Modeling results showed that category salience consistently increased the extent of stereotype application but increased stereotype activation in more limited contexts. Implications for models of social categorization and stereotyping are discussed.

Keywords

category salience, process modeling, stereotyping, stereotype activation, stereotype application, social categorization

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Impressions of others are often influenced by the social categories to which they belong (Fiske & Neuberg, 1990; Freeman & Ambady, 2011). This tendency to categorize people is a robust and spontaneous process that occurs early in person perception (Ito & Urland, 2003; Stangor, Lynch, Duan, & Glas, 1992). Because social categories have associated stereotypes, when a person is categorized, they also are more likely to be judged according to group stereotypes (Taylor, Fiske, Etcoff, & Ruderman, 1978). More generally, factors that increase social categorization also increase stereotyping (e.g., Brewer, 1988; Fiske & Neuberg, 1990; Kunda & Spencer, 2003).

Although social categorization and stereotyping are clearly related, there has been relatively little direct investigation of the specific processes by which categorization impacts stereotyping. In the present research, we are particularly interested in the roles of stereotype activation (SAC) and stereotype application (SAP) in this relationship. Whereas SAC describes an increase in the accessibility of a stereotype in memory, SAP refers to the use of an activated stereotype in judgment (e.g., Gilbert & Hixon, 1991). Theoretically, increased categorization might yield increased stereotyping by increasing SAC, SAP, or both.

Based on prior research, one might conclude that categorization should primarily influence SAC. This is because much of the work addressing this question has relied on priming tasks that were thought to reflect only the extent of SAC and to not be influenced by SAP (e.g., Devine, 1989; Devine & Monteith, 1999; Lepore & Brown, 1997; Wheeler & Fiske, 2005). However, it has since become clear that these kinds of priming tasks do not offer a process-pure window into knowledge activation. Rather, they also reflect a variety of processes that determine the extent to which activated knowledge influences performance (e.g., Payne, 2001; Sherman et al., 2008). Most critically, no research has examined the simultaneous influence of social categorization on independent estimates of SAC and SAP that are derived from performance on the same task. This is necessary to ensure that any observed differences in the extent of SAC and SAP are not confounded with measurement. That is, if different tasks are used to measure distinct processes, then any outcomes may be due to the demands of the tasks, rather than to differences in the processes of interest (e.g., outcomes differ

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because of "structural fit"; Payne, Burkley, & Stokes, 2008). Thus, the extent to which categorization impacts stereotyping via SAC versus SAP remains an open question.

Determining the mechanisms underlying the relationship between categorization and stereotyping is both theoretically and practically important. Depending on the mechanism, the conditions under which stereotyping is more or less likely and the interventions that may be expected to reduce stereotyping will differ. For example, SAC is often considered to be a less controllable process than SAP (Devine, 1989; Fazio, Jackson, Dunton, & Williams, 1995). Thus, understanding whether categorization increases stereotyping due to changes in a relatively more controllable (SAP) or less controllable (SAC) process has implications for understanding how stereotyping may be reduced. In particular, if categorization increases stereotyping through changes in application, interventions may be able to reduce stereotyping by affecting processes that occur after stereotypes have been activated. Thus, it may not be necessary to change underlying stereotypes as long as the expression of those stereotypes can be reduced. However, if categorization primarily influences SAC, interventions will need to focus on reducing the strength of the associations between categories and stereotypes (i.e., interventions will need to target underlying representations). In addition, better understanding the underlying mechanisms in the relationship between categorization and stereotyping improves our ability to design interventions that target the most relevant processes.

Overview of the Current Research

To examine how categorization impacts stereotyping processes, we utilized the stereotype misperception task (SMT; Krieglmeyer & Sherman, 2012). The SMT is ideal for investigating this question because data from the SMT can be subjected to a multinomial processing model that provides independent estimates of SAC and SAP. Models such as the SMT are advantageous for understanding process as they can measure the extent to which multiple processes contribute to a single outcome, rather than using separate tasks to measure different processes. Prior work has used separate tasks to measure the extents of activation and application. The potential problem with this approach is that it opens the possibility that observed differences in the processes may be due to task variance rather than to differences between activation and application, per se. In the SMT model, SAC assesses the extent to which stereotypes are activated, whereas SAP represents the likelihood that activated stereotypes are applied in judgment. The SMT also estimates a detection parameter (D) that represents the likelihood that a target will be accurately judged or individuated, and a guessing parameter (G) that measures general response bias. A more detailed description of the model can be found in the "Method" section.

To manipulate the extent of categorization, we varied the salience of social categories. Because categories and stereotypes are closely linked, factors that make categories more distinct or salient also lead to more stereotyping. One factor known to influence category salience is group composition (Abrams, Thomas, & Hogg, 1990). For example, multiple studies have found that groups with a homogeneous social category composition (e.g., a group of all Black or all White individuals) are categorized and stereotyped to a lesser degree than groups with a heterogeneous composition (e.g., a group of both Black and White individuals) because variety highlights differences among a set (Abrams et al., 1990; Macrae & Cloutier, 2009; Oakes & Turner, 1986).

In the present research, to manipulate category salience, we employ a variant of the "priming context" manipulation used in Macrae and Cloutier (2009). To create a low salience context, we "block" the primes by race. In this condition, participants only see Black or White faces, which has been shown to reduce the extent of category activation (Macrae & Cloutier, 2009). To create a high salience context, we "mix" the racial category of the primes. In this condition, participants randomly see Black and White faces, which increase the extent of category activation (Macrae & Cloutier, 2009).

In Experiment 1, we compare stereotyping in blocked versus mixed contexts, as well as the extents of SAC and SAP in the different contexts. In Experiment 2, we test whether category salience influences the effect of category prototypicality on stereotyping. We use Experiment 2 to demonstrate that the SMT model is sensitive to changes in category salience. Finally, in Experiment 3, we further examine the relationships among category salience and stereotyping processes by decreasing salience. We compare SAC and SAP in conditions in which categories are never made salient to high category salience conditions.

Experiment 1

Method

Participants.[1] In Experiment 1, 149 undergraduates at a university in California participated. Our sample size was powered at 95% using the smallest effect size ($\eta_p^2 = .22$) for the prime main effect reported in Krieglmeyer and Sherman (2012). Following outlier exclusion procedures from the original SMT protocol, two participants were removed from the analysis for pressing the same key on every trial. All participants were given partial course credit as compensation. We conducted a sensitivity analysis to quantify the level of power afforded by the final sample of 147 participants. A sensitivity analysis for a two-tailed paired t test at 80% power, $\alpha = .05$ indicated that we would be able to detect an effect size of $d_z = .233$ or larger.

Materials. Prime stimuli included pictures of faces of 24 White and 24 Black young men on a gray background taken from Krieglmeyer and Sherman (2012). Neutral primes were 24 gray face-like shapes.[2]

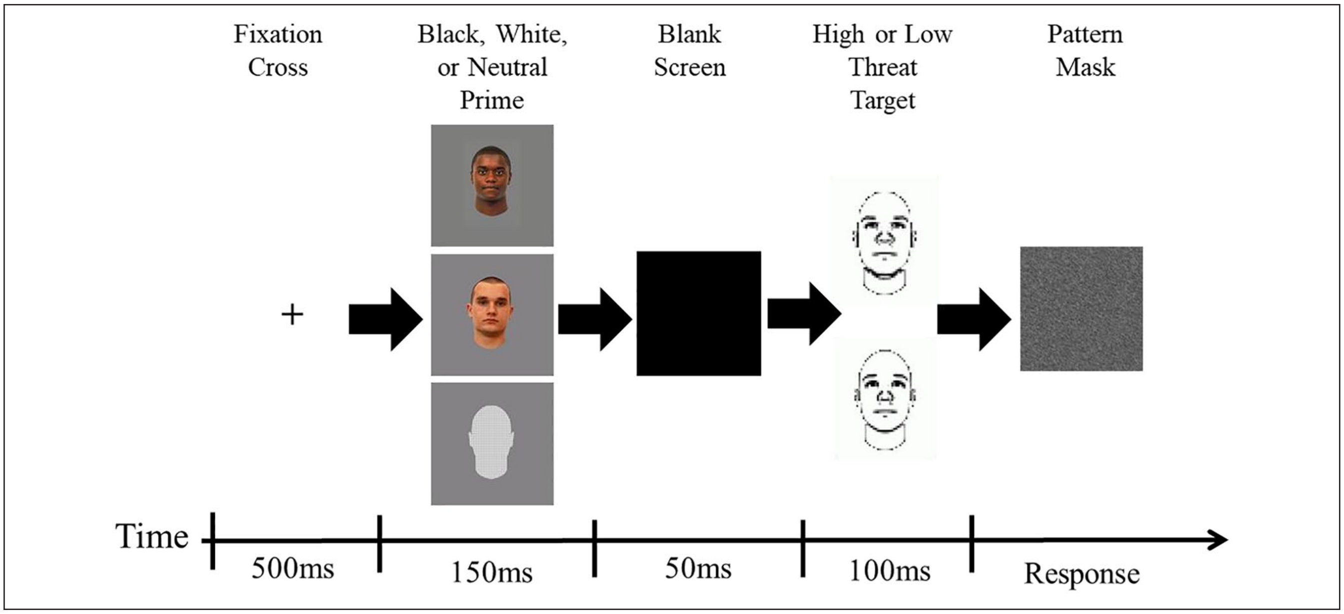

Figure 1. Visual representation of the SMT procedure.
Note. SMT = stereotype misperception task.

Target stimuli were 48 ambiguous male face drawings, which were made from pictures developed by Oosterhof and Todorov (2008) to vary in objective level of threat. Half of the target faces were two standard deviations above a neutral level of threat, whereas the other half was 2 standard deviations below neutral threat. These faces were converted into blurred face drawings to make the extent of threat more difficult to detect (Krieglmeyer & Sherman, 2012).

Procedure

SMT. Participants completed the experiment individuallly on computers in groups of 1 to 4 people. The SMT is framed as an impression formation task. On a given trial, participants are presented with a Black, White, or neutral prime, which is followed by a target face. Participants are instructed to judge whether target faces are more or less threatening than the average face presented on the task.

The current experiment followed the task procedure outlined in Krieglmeyer and Sherman (2012). Each trial began with a fixation cross presented for 500 ms, followed by a prime presented for 150 ms, which was followed by a blank screen for 50 ms, and then a target for 100 ms. After the presentation of the target, a patterned back mask was presented and remained on the screen until participants made a judgment about whether the target face was more or less threatening than the average target faces presented in the task. Judgments on the task were framed as relative rather than absolute in order to avoid floor or ceiling effects if participants feel that targets are all threatening or unthreatening (Krieglmeyer & Sherman, 2012). Participants were told to pay attention to the prime faces but to not allow them to affect their judgments. Therefore, any influence of the primes on judgments of the targets would be unintentional. A 500 ms intertrial interval separated trials. To acclimate participants to the task, participants completed two sets of practice blocks. In the first practice block, participants made threat judgments for six trials in which only target faces were presented. In the second practice block, participants made threat judgments for six trials in which both primes and targets were presented. All prime and target types were included in the practice blocks. Typically, following the practice trials, participants complete two sets of 72 test trials on the SMT. In the current experiment, due to the priming context manipulation, participants completed five sets of 80 test trials. The typical finding on the SMT is a prime main effect showing that Black primes lead to a greater proportion of "more threatening" judgments of targets than White primes (see Figure 1).

Manipulation of categorization. To manipulate categorization, we employed a variant of a category salience manipulation used in Macrae and Cloutier (2009). Specifically, primes were presented in a way that made categories either higher or lower in salience. On half of the trials, participants made judgments in a "mixed" context, in which prime race randomly varied. Variation in the prime race makes the categories salient. In contrast, on the other half of trials, judgments were made in a "blocked" context, in which only one prime race was presented in each block. The lack of change in prime race makes racial categories less salient. Priming context was manipulated within-subjects, in counterbalanced blocks. There were 200 trials in which primes were presented in a blocked context. The other 200 trials were presented in a mixed context (see Figure 2).

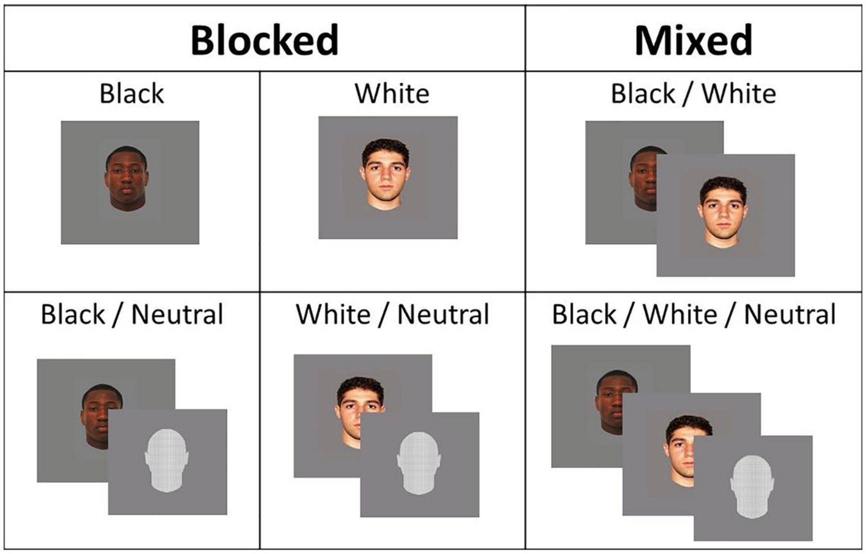

Figure 2. Visual representation of the priming context manipulation conditions.

Table 1. Proportion Threat Judgments (and Standard Errors) as a Function of Priming Context, Prime, and Target.

	Experiment 1					
	Priming context					
	Blocked			Mixed		
	Black	Neutral	White	Black	Neutral	White
High threat	.51 (.02)	.34 (.02)	.41 (.02)	.54 (.02)	.33 (.02)	.36 (.02)
Low threat	.47 (.02)	.26 (.02)	.35 (.02)	.51 (.03)	.24 (.02)	.33 (.02)

Note. Primes listed horizontally in the top row. Targets listed vertically in column.

Design. The experiment used a 2 (context order: blocked first vs. mixed first) × 2 (priming context: blocked vs. mixed context) × 2 (prime: Black vs. White) × 2 (target: high vs. low threat) mixed design. All factors were within-subjects, with the exception of the counterbalanced priming context order.

Results

SMT effect. To examine whether priming context moderated stereotyping, we subjected the proportion of "more threatening" responses to a 2 (priming context order: blocked context first vs. mixed context first) × 2 (priming context: blocked vs. mixed) × 3 (prime: Black vs. neutral vs. White) × 2 (target: high vs. low threat) mixed-analysis of variance (ANOVA).[3] There was a main effect of target, $F(1, 145) = 28.56$, $p < .001$, $\eta_p^2 = .165$, such that high threat targets were given a greater proportion of threat judgments than low threat targets. There also was a prime main effect, $F(2, 290) = 32.24$, $p < .001$, $\eta_p^2 = .182$ (see Table 1). Simple comparisons showed that targets were judged as more threatening following Black primes than White primes, $F(1, 145) = 31.44$, $p < .001$, $\eta_p^2 = .177$, 95% confidence interval of the difference (CIdiff) = [.10, .20], and neutral primes, $F(1, 145) = 55.88$, $p < .001$, $\eta_p^2 = .277$, 95% CIdiff = [.16, .27]. In addition, White primes led to a greater proportion of threat judgments than neutral primes, $F(1, 146) = 6.28$, $p = .013$, $\eta_p^2 = .041$, 95% CIdiff = [.01, .12].

Of primary interest, if priming context affected stereotyping, we expected to observe a priming context × prime interaction, indicating that stereotyping was reduced in the blocked context compared with the mixed context. We found the anticipated priming context × prime interaction, $F(2, 290) = 6.82$, $p = .001$, $\eta_p^2 = .045$, which indicated that the prime main effect in the blocked context was weaker, $F(2, 292) = 22.73$, $p < .001$, $\eta_p^2 = .135$, than the prime effect in the mixed context, $F(2, 292) = 35.56$, $p < .001$, $\eta_p^2 = .196$ (see Figure 3 for mean proportions). In the blocked context, Black primes led to a greater proportion of threat judgments than White primes, $F(1, 146) = 18.54$, $p < .001$, $\eta_p^2 = .113$,

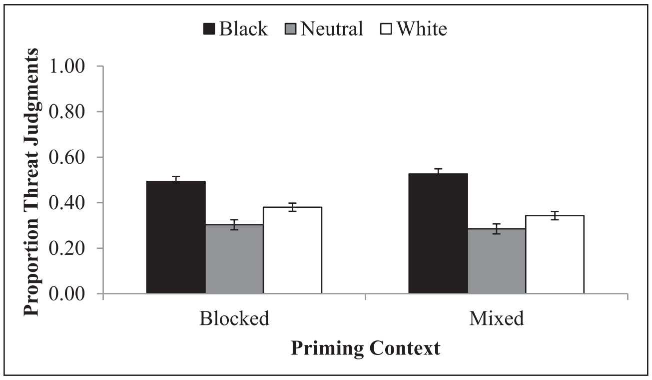

Figure 3. Proportion of threat judgments as a function of priming context and prime in Experiment 1.
Note. Error bars represent standard error of the mean.

95% CIdiff = [.06, .17]. However, this prime effect was stronger in the mixed context, $F(1, 146) = 37.30$, $p < .001$, $\eta^2_p = .203$, 95% CIdiff = [.12, .24]. Overall, these results indicate that priming context moderated stereotyping, such that the blocked (vs. mixed) context reduced the tendency to judge targets as more threatening after Black primes, compared with White primes.

Modeling overview. To examine the cognitive mechanisms that underpin the effect of priming context, we applied the SMT multinomial processing tree model. The SMT model estimates four parameters, each representing a latent cognitive process: SAC, SAP, detection (D), and guessing tendency (G). The processing model is designed to describe how these four processes interact to produce responses on the task. A racial prime can activate a stereotype with the probability of (SAC) or fail to activate stereotypes with the probability (1-SAC). If a stereotype is activated, it will be applied in judgment with the probability of (SAP) or not applied with probability of (1-SAP). When a stereotype is activated and applied in judgment, participants will give a stereotype consistent response (e.g., selecting the "more threatening" response following a Black prime). In contrast, if a stereotype is activated but not applied, a stereotype inconsistent response will be given (e.g., selecting "less threatening" following a Black prime). If a stereotype is not activated, participants can correctly detect (D) the target threat level (e.g., selecting the "more threatening" response when the target is high in threat). If the threat level is not detected (1-D), participants will either guess "more threatening" with the probability of (G) or "less threatening" with a probability of (1-G).

Parameters from the SMT model are estimated from the observed frequencies of responding "more" or "less" threatening, depending on the prime and target combination. These responses are entered into equations that make up a processing tree. Each branch represents a combination of processes that occur with a certain probability, and that result in a particular response given the prime and target type. The probability for each branch is based on the product of all the probabilities of the processes in the branch (see Figure 4 for the structure of the modeling tree).

To illustrate, consider a trial in which a prime is Black and the threat of the target is low. A "more threatening" judgment may come from stereotype activation and stereotype application (SAC * SAP). Alternatively, a more threatening judgment could come from guessing "more threat," when the stereotype is not active and the target threat is not correctly detected ([1-SAC] * [1-D] * G). Therefore, if a Black prime and a low threat target are presented on the same trial, the probability of a high threat judgment is ([SAC * SAP] + [1-SAC] * [1-D] * G).

The parameter values are generated using maximum likelihood estimation. Maximum likelihood iterates until the model's expected frequencies most closely match the observed data. Parameter values range from 0 to 1 and represent the probability that the process is contributing to the observed data. We used the freely available computer package MultiTree (Moshagen, 2010), which reports model fit using the G^2 statistic and a p value. If the model approximates the observed data well, the G^2 value should be small, and the p value should be large. Model fit can also be used to compare groups for significant differences in a given parameter estimates. For example, to test whether priming context influences SAC, we would set the SAC parameter for the blocked context to be equal to the SAC parameter for the mixed context. Any significant change in model fit (G^2) would suggest that the manipulation affected SAC.

Modeling results. First, we aggregated the sums of the "more threatening" and "less threatening" responses based on each of the SMT trial types for both the blocked and mixed

Table 2. Model Fits Comparing Several MPT Models.

	MDL	AIC	BIC
Experiment 1			
SMT	23,082.10	46,117.73	46,185.55
d-SMT	23,090.18	46,135.84	46,203.66
PDg	23,336.59	46,635.47	46,686.34
Experiment 2			
SMT	21,220.36	42,394.76	42,462.08
d-SMT	21,236.09	42,428.18	42,495.50
PDg	21,612.24	43,187.17	43,237.66
Experiment 3			
SMT	34,182.61	68,316.05	68,386.99
d-SMT	34,214.07	68,380.93	68,451.86
PDg	34,627.83	69,215.93	69,269.13

Note. Lower numbers denote less model misfit. MPT = multinomial processing tree. Fit critera: MDL = minimum description length; AIC = Akaike information criterion; BIC = Bayesian information criterion. Model acronyms: SMT = stereotype misperception; d-SMT = detection-first SMT, PDg = process dissociation with guessing parameter.

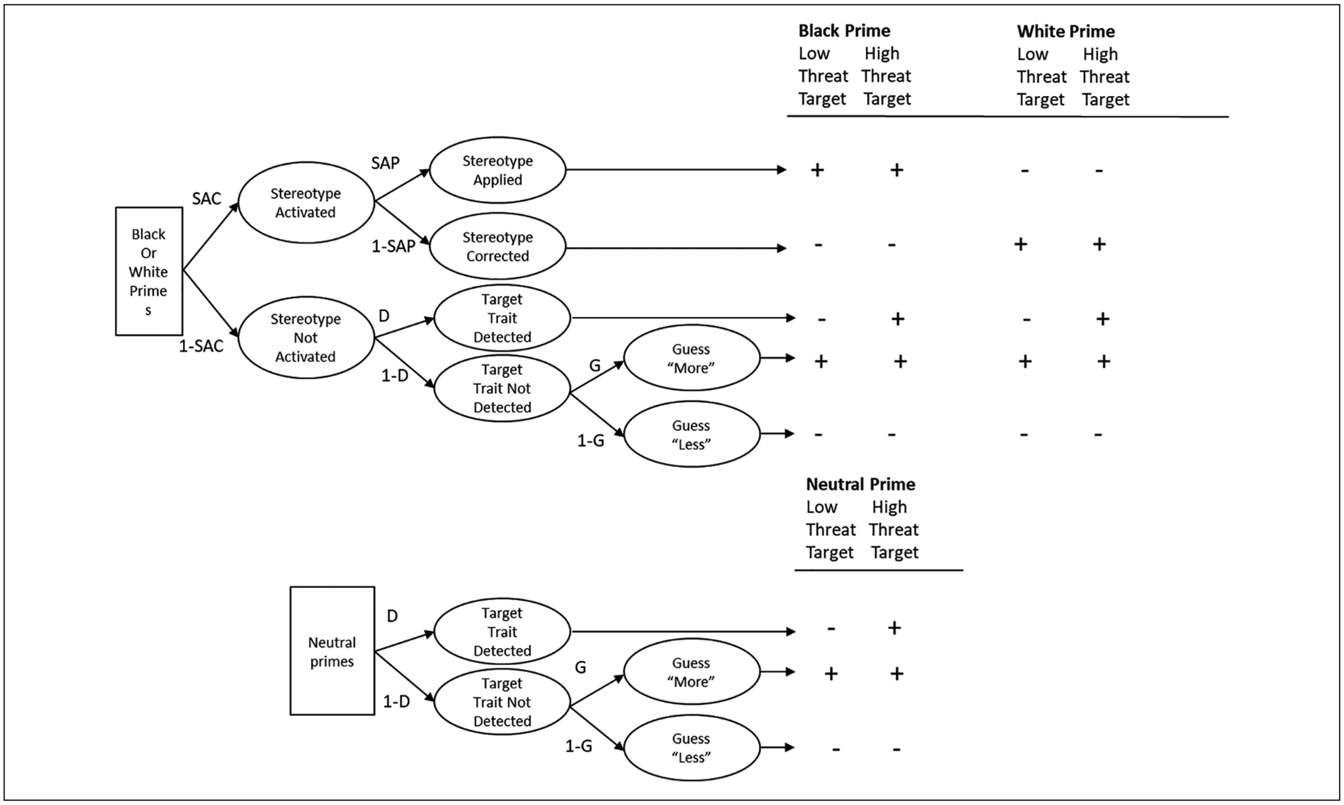

Figure 4. Structure of the SMT multinomial processing tree.
Note. The top part shows the model for Black and White primes, and the bottom part shows the model for neutral primes. The table on the right depicts the responses as a function of prime and target. The response "more threat" is represented by a "+" sign, and the response "less threat" is represented by a "–" sign. SMT = stereotype misperception task; SAC = stereotype activation; 1-SAC = lack of stereotype activation; SAP = stereotype application; 1-SAP = stereotype correction; D = detection of target threat; 1-D = detection of target trait; G = tendency to guess "more threat"; 1-G = tendency to guess "less threat."

contexts. The model misfit was minimal, $G^2(4) = 4.82$, $p = .306$. We also estimated the effect size of the extent of model misfit with the *w* statistic, which controls for power. The effect size of model misfit was small, $w = .011$.

To examine the processes by which priming context influenced stereotyping on the SMT, we fit the model to the blocked and mixed contexts. We first fit a baseline model that had no parameter restrictions (i.e., parameters were allowed to vary freely). Then, to test for differences between groups, we constrained each parameter one at a time across groups. A significant loss in fit from the baseline model suggests that the parameter estimates differ reliably across priming contexts.

First, we investigated whether the SAC parameter differed across priming context. There was no difference between the blocked (SAC = .66; 95% confidence interval (CI) = [.61, .71]) and mixed contexts (SAC = .69; 95% CI = [.65, .74]) in level of SAC, $\Delta G^2(1) = .86$, $p = .354$, $w = .005$. Next, we compared the SAP estimates for the two contexts. SAP was lower in the blocked (*SAP* = .58; 95% CI = [.57, .60]) than in the mixed context, $\Delta G^2(1) = 19.45$, $p < .001$, $w = .023$ (SAP = .63; 95% CI = [.62, .65]; see Table 3 for parameter estimates; see Table 4 for model fit by Experiment).

Table 3. SMT Model Parameter Estimates [and 95% CIs] by Priming Context.

	Experiment 1	
	Blocked	Mixed
SAC	.66 [.62, .71]	.70 [.65, .74]
SAP	.58 [.57, .60]	.63 [.62, .65]
D	.09 [.07, .11]	.09 [.07, .12]
G	.29 [.27, .30]	.26 [.25, .28]

Note. SMT = stereotype misperception task; CI = confidence interval; SAC = stereotype activation; SAP = stereotype application; D = target detection; G = guessing.

There was an unanticipated difference between the two contexts in G parameter estimates, $\Delta G^2(1) = 4.92$, $p = .03$, $w = .012$, indicating that G was higher in the blocked than the mixed context (see Figure 2). This shows that participants were more likely to guess "more threat" in the blocked condition. This effect does not replicate in subsequent exper-

Table 4. Model Fit Statistics.

Fit statistic	
Study 1: context analysis	
MDL (FIA)	231.10
cFIA	31.24
AIC	46,117.73
BIC	46,185.55
Study 2: context analysis	
MDL (FIA)	23,082.10
cFIA	31.24
AIC	46,117.73
BIC	46,185.55
Study 2: prototypicality analysis	
MDL (FIA)	20,920.70
cFIA	30.99
AIC	41,795.42
BIC	41,862.74
Study 3: context analysis	
MDL (FIA)	34,182.61
cFIA	32.58
AIC	68,316.05
BIC	68,386.99

Note. MDL = minimum description length; FIA = Fisher information approximation; cFIA = complexity FIA; AIC = Akaike information criterion; BIC = Bayesian information criterion.

iments and cannot account for the greater degree of stereotyping in the mixed condition.[5]

Discussion

In Experiment 1, there was more stereotyping in the mixed condition than the blocked condition, indicating that category salience increased stereotyping. The SMT model revealed that this effect of priming context on stereotyping was associated with changes in SAP. Specifically, the level of SAP was higher in the mixed than in the blocked priming context. Somewhat unexpectedly, priming context had no notable impact on SAC. These findings indicate that variation in category salience mainly affected the extent to which activated stereotypes were applied.

Because our SAC modeling findings were unexpected, given the current literature, we conducted Experiment 2 as a replication and extension of Experiment 1. Experiment 2 used an identical design to Experiment 1, but added an additional factor of Black prime prototypicality. Prior research found that high prototypic Black primes tend to elicit more SAC than low prototypic Black primes (Krieglmeyer & Sherman, 2012). By manipulating Black prime prototypicality, we are able to further establish that the SMT is sensitive to changes in SAC and that the findings of Experiment 1 are not due to a lack of measurement sensitivity. Furthermore, little research has been conducted on how category salience might also impact within-category stereotyping, that is, the extent of stereotyping depending on category prototypicality. Experiment 2 allows us to examine how within-category stereotyping might be influenced by category salience.

Experiment 2

Method

Participants. In all, 140 undergraduates from a university in California participated in Experiment 2. One participant was removed from the analysis due to a data writing error. Once again, our sample size was powered at 95% using the smallest effect size ($\eta_p^2 = .22$) for the prime main effect reported in Krieglmeyer and Sherman (2012). Just as before, we conducted a sensitivity analysis to quantify the level of power afforded by the final sample of 139 participants. A sensitivity analysis conducted for a two-tailed paired t test at 80% power, $\alpha = .05$ indicated that we would be able to detect an effect size of $dz = .240$ or larger.

Materials and procedure. Similar to Experiment 1, prime stimuli were 24 White and Black male faces on a gray background, and neutral primes were gray face-like shapes. Novel to Experiment 2, we added an additional variable of Black prime prototypicality, using the stimuli and design employed in Krieglmeyer and Sherman (2012, Experiment 4). The 24 Black primes were divided into two sets of 12 low prototypic and 12 high prototypic faces. The White faces and neutral primes also were randomly divided into high or low prototypic sets. As a result, the high and low prototypic sets of primes only vary with respect to Black prototypicality. Just as in Experiment 1, we manipulated category salience using priming context. The SMT procedure and number of trials were identical to Experiment 1.

Design. The Experiment used a 2 (context order: blocked first vs. mixed first) × 2 (priming context: blocked vs. mixed context) × 3 (prime: Black vs. neutral vs. White) × 2 (prime set: high vs. low prototypic) × 2 (target: high vs. low threat) mixed design. All factors were within-subjects, with the exception of counterbalanced priming context order.

Results

SMT effect. To examine the effect of priming context on stereotyping, we subjected the proportion of "more threatening" judgments to a 2 (priming context order: blocked context first vs. mixed context first) × 2 (priming context: blocked vs. mixed context) × 3 (prime: Black vs. neutral vs. White) × 2 (prime set: high vs. low prototypic) × 2 (target: high vs. low threat) mixed-ANOVA. This analysis revealed a main effect of target, $F(1, 137) = 33.20$, $p < .001$, $\eta_p^2 = .195$, such that high threat targets were given a greater proportion of threat judgments than low threat targets (see Table 5 for

Table 5. Proportion of Threat Judgments (and Standard Errors) as a Function of Priming Context, Prime, and Target.

	Experiment 2					
	Blocked			Mixed		
	Black	Neutral	White	Black	Neutral	White
High threat	0.51 (0.02)	0.29 (0.02)	0.39 (0.02)	0.57 (0.02)	0.32 (0.02)	0.36 (0.02)
Low threat	0.49 (0.02)	0.21 (0.02)	0.34 (0.02)	0.51 (0.02)	0.21 (0.02)	0.32 (0.02)

Note. Primes listed horizontally in the top row. Targets listed vertically in column.

mean proportions). There also was a main effect of prime, $F(2, 274) = 63.66$, $p < .001$, $\eta_p^2 = .317$, which simple effects revealed was due to Black primes leading to a greater proportion of threat judgments than White, $F(1, 138) = 45.59$, $p < .001$, $\eta_p^2 = .248$, 95% CIdiff = [.11, .21], and neutral primes, $F(1, 138) = 112.46$, $p < .001$, $\eta_p^2 = .449$, 95% CIdiff = [.21, .31]. White primes also led to a greater proportion of threat judgments than neutral primes, $F(1, 138) = 19.03$, $p < .001$, $\eta_p^2 = .121$, 95% CIdiff = [.05, .14].

There also was a prime set main effect, $F(1, 137) = 69.47$, $p < .001$, $\eta_p^2 = .336$, that was qualified by an interaction with prime, $F(2, 274) = 120.47$, $p < .001$, $\eta_p^2 = .468$. Simple effects analyses indicated that high prototypic Black primes led to a greater proportion of threat judgments than low prototypic Black primes, $F(1, 138) = 201.24$, $p < .001$, $\eta_p^2 = .593$, 95% CIdiff = [.20, .26]. The White primes also differed by set, $F(1, 138) = 20.89$, $p < .001$, $\eta_p^2 = .131$, 95% CIdiff = [.03, .06], indicating that White primes that were presented with the low Black prototypic set led to more threat judgments than White primes presented in the high prototypic set. Neutral primes were not treated differently based on prime set, $F(1, 138) = .00$, $p = .989$, $\eta_p^2 < .001$ (see Table 6 for mean proportions).

If priming context moderated race-based stereotyping, this would reveal a priming context by prime interaction. Once again, we found the anticipated interaction, $F(2, 274) = 6.10$, $p = .003$, $\eta_p^2 = .042$, which indicated that the prime main effect in the blocked context was weaker, $F(2, 276) = 48.53$, $p < .001$, $\eta_p^2 = .260$, than in the mixed context $F(2, 276) = 59.79$, $p < .001$, $\eta_p^2 = .302$ (see Figure 5 for mean proportions). Simple effects analyses revealed that there was a smaller difference in threat judgments following Black versus White primes in the blocked context $F(1, 138) = 29.70$, $p < .001$, $\eta_p^2 = .177$, 95% CIdiff = [.09, .19], than there was in the mixed context, $F(1, 138) = 50.71$, $p < .001$, $\eta_p^2 = .269$, 95% CIdiff = [.14, .25] (see Figure 6 for mean proportions). There was no three-way interaction among context, prime, and prime set, $F(2, 274) = .64$, $p = .529$, $\eta_p^2 = .005$, indicating that category salience did not moderate the effect of prototypicality on stereotyping.

Modeling results. There were two primary findings in Experiment 2: moderation of prime by priming context and an interaction between prime and prime set. To understand the

Table 6. Proportion of Threat Judgments (and Standard Errors) as a Function of Prime and Prime Set.

	Experiment 2		
	Black	Neutral	White
High set	0.64 (0.02)	0.25 (0.02)	0.33 (0.02)
Low set	0.40 (0.02)	0.26 (0.02)	0.38 (0.02)

Note. Primes listed horizontally in the top row. Prime set listed vertically in column.

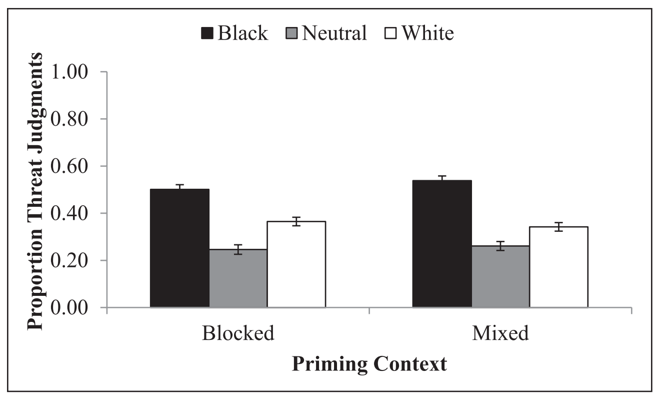

Figure 5. Proportion of threat judgments as a function of priming context and prime in Experiment 2.
Note. Error bars represent standard error of the mean.

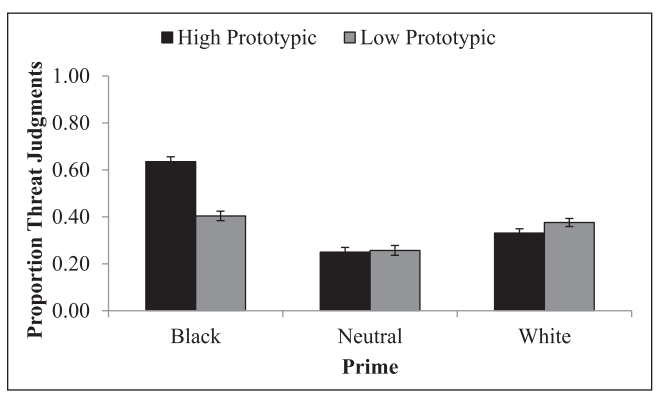

Figure 6. Proportion of threat judgments as a function of prime and prime set in Experiment 2.
Note. Error bars represent standard error of the mean.

Table 7. SMT Model Parameter Estimates [and 95% CIs] by Priming Context.

	Experiment 2	
	Blocked	Mixed
SAC	0.72 [.68, .75]	0.74 [.58, .61]
SAP	0.59 [.58, .61]	0.63 [.62, .64]
D	0.11 [.09, .13]	0.12 [.09, .14]
G	0.23 [.22, .25]	0.23 [.21, .24]

Note. SMT = stereotype misperception task; CI = confidence interval; SAC = stereotype activation; SAP = stereotype application; D = target detection; G = guessing.

Table 8. SMT Model Parameter Estimates [and 95% CIs] by Prime Set.

	Experiment 2	
	High set	Low set
SAC	0.92 [.88, .95]	0.55 [.51, .95]
SAP	0.67 [.65, .68]	0.52 [.51, .59]
D	0.10 [.08, .13]	0.11 [.09, .13]
G	0.23 [.22, .25]	0.23 [.21, .24]

Note. SMT = stereotype misperception task; CI = confidence interval; SAC = stereotype activation; SAP = stereotype application; D = target detection; G = guessing.

processes underlying these results, we fit the data to two different models. In the first model, we examined the effect of priming context on stereotyping processes. Model misfit was minimal according to both measures of fit, $G^2(4) = 7.65$, $p = .105$, $w = .016$. As in Experiment 1, we found no difference between the blocked (SAC = .72; 95% CI = [.67, .75]) and mixed contexts (SAC = .74; 95% CI = [.70, .77]) in level of SAC, $\Delta G^2(1) = .51$, $p = .474$, w = .004. However, the contexts did differ in the level of SAP, $\Delta G^2(1) = 14.10$, $p < .001$, $w = .020$, indicating that SAP was lower in the blocked (SAP = .60, 95% CI = [.58, .61]) than in the mixed context (SAP = .63; 95% CI = [.62, .64]), replicating the results from Experiment 1 (see Table 7 for parameter estimates).

The second model examined the effect that Black prototypicality had on stereotyping processes. Model fit differed significantly from zero on the G^2 measure of misfit, $G^2(4) = 14.322$, $p = .006$. However, the w effect size statistic indicated that the magnitude of misfit was small, $w = .021$. This analysis revealed a significant difference between the two prime sets in level of SAC, $\Delta G^2(1) = 173.566$, $p < .001$, $w = .072$, such that activation was greater in the high prototypic prime set (SAC = .91; 95% CI = [.88, .95]), than in the low prototypic prime set (SAC = .55; 95% CI = [.51, .59]), replicating previous findings (Krieglmeyer & Sherman, 2012). SAP was similarly affected by prototypicality, $\Delta G^2(1) = 154.41$, $p < .001$, $w = .068$, such that the extent of application was greater for the high prototypic prime set, (SAP = .67; 95% CI = [.65, .68]) than the low prototypic prime set (SAP = .52; 95% CI = [.51, .54]; see Table 8 for parameter estimates).

Discussion

Results from Experiment 2 replicated and extended those from Experiment 1. We found that category salience moderated stereotyping, such that high category salience led to more stereotyping than low category salience. As in Experiment 1, high (vs. low) category salience was associated with an increase in SAP, but not an increase in SAC. In addition, Black prototypicality moderated stereotyping, indicating that stereotyping was greater when Black primes were more (vs. less) prototypic. The effect of Black prototypicality was unaffected by category salience. The greater stereotyping of high prototypic Black primes was associated with greater SAC and SAP. This finding replicates prior research in finding that Black prototypicality reliably increases activation (Krieglmeyer & Sherman, 2012). In addition, this offers support to the idea that categorization is graded, where targets that are highly typical of a category lead to quicker and stronger categorization than targets low in typicality (Medin, 1989; Mur et al., 2012; Rosch, 1973; Rosch & Mervis, 1975).

Experiments 1 and 2 suggest that categorization influences stereotyping primarily by changing SAP, rather than activation. Category salience seemed to have little impact on SAC. However, results indicate that SAC is much greater than zero, regardless of category salience. In addition, even in low category salience conditions, we observe stereotyping. These findings are consistent with the perspective that categories are activated early and spontaneously in person perception.

Experiment 3

Method

To better understand the relationship between categorization and SAC, in our next experiment, we further decreased category salience. Given that SAC was equal in the low and high category salience conditions in Experiments 1 and 2, it seemed plausible that merely seeing the racial category change, even in a low salience condition, was sufficient to activate stereotypes. There were several occasions throughout the task in Experiments 1 and 2 in which racial category varied. During the practice trials, all participants saw primes presented in a mixed context. In addition, all participants saw several versions of both the blocked and mixed contexts. As such, in the prior experiments, we were unable to examine the effect of merely seeing more than one level of prime (e.g., varying race) on SAC. In Experiment 3, we manipulate category salience between-subjects to ensure that participants in the blocked context are only ever exposed to conditions of low category salience.

Table 9. Proportion of Threat Judgments (and Standard Errors) as a Function of Priming Context, Prime, and Target.

	Experiment 3					
	Blocked			Mixed		
	Black	Neutral	White	Black	Neutral	White
High threat	0.44 (0.02)	0.35 (0.02)	0.45 (0.01)	0.50 (0.02)	0.35 (0.03)	0.42 (0.02)
Low threat	0.40 (0.02)	0.24 (0.02)	0.40 (0.01)	0.45 (0.02)	0.23 (0.02)	0.37 (0.02)

Note. Primes listed horizontally in the top row. Prime set listed vertically in column.

Participants. Participants were 364 undergraduates at a university in California who participated for partial course credit. Our sample size was based on the effect size for the prime simple effect for Black versus White primes obtained in Experiment 1, within the blocked context, $\eta_p^2 = .13$, to be powered for at least 85% power. Three participants were removed from the analysis for pressing the "less threatening" key on every trial. Similar to the previous studies, we conducted a sensitivity analysis to quantify the level of power afforded by our final sample of 364 participants with a between-subjects design. A sensitivity analysis conducted for a two-tailed independent t test at 80% power, $\alpha = .05$ indicated that we would be able to detect an effect size of $d = .280$ or larger.

Design. The experiment used a 2 (priming context: blocked vs. mixed context) × 3 (prime: Black vs. neutral vs. White) × 2 (target: high vs. low threat) mixed design. Although priming context manipulated category salience in a conceptually similar way to the prior experiments, there were now two counterbalanced blocked priming contexts. Specifically, participants in the blocked condition were randomly assigned to either see Black vs. neutral primes or White vs. neutral primes during the first block of the task. In the second block, they saw the prime race that was not presented in the first block (e.g., if they saw Black vs. Neutral primes in the first block, they would see White vs. neutral primes in the second block). In this way, participants saw all of the primes but presented in a blocked (low salience) context for the entire session. In the mixed condition, participants saw Black vs. neutral vs. White primes presented randomly throughout all blocks of the task. All other factors were manipulated within-subjects.

Materials. Stimuli were identical to those used in Experiment 1.

Procedure. The procedure of the SMT was identical to Experiment 1. Priming context was manipulated similarly to Experiment 1 but was now implemented as a between-subjects variable. With the simplification of the design, we shortened the task to 144 trials. Participants in the blocked priming context saw 72 trials of Black and neutral primes (48 Black, 24 neutral) and 72 trials with White and neutral primes (48 White, 24 neutral), counterbalanced. Within each block, trials were randomly presented. In the within-subjects priming context, there were 144 trials of Black, neutral, and White primes (48 of each) randomly presented. Participants in all conditions were given a break after every 72 trials.

Results

SMT effects. To examine the effect of priming context on stereotyping, we subjected the proportion of more threatening responses to a 2 (priming context: blocked vs. mixed) × (prime: Black vs. neutral vs. White) × 2 (target threat: high vs. low) mixed-ANOVA. There was a target main effect, $F(1, 359) = 128.28$, $p < .001$, $\eta_p^2 = .263$, indicating that high threat targets were judged as more threatening on a greater proportion of trials than low threat targets. In addition, there was a prime main effect, $F(2, 664.40$[6]$) = 47.01$, $p < .001$, $\eta_p^2 = .116$, indicating that Black primes led to a somewhat greater proportion of more threatening judgments than White, $F(1, 360) = 2.42$, $p = .120$, $\eta_p^2 = .007$, 95% CIdiff = [–.01, .05] and neutral primes, $F(1, 360) = 66.16$, $p < .001$, $\eta_p^2 = .155$, 95% CIdiff = [.11, .18] (see Table 9 for mean proportions). White primes also led to a greater proportion of more threatening judgments than Neutral primes, $F(1, 360) = 58.28$, $p < .001$, $\eta_p^2 = .139$, 95% CIdiff = [.09, .15].

Of primary interest was whether priming context moderated stereotyping, such that there was more stereotyping in the mixed relative to the blocked context, which would be indicated by a priming context by prime interaction. As expected, priming context moderated stereotyping, $F(2, 664.40) = 4.12$, $p = .019$, $\eta_p^2 = .011$, such that there was a weaker prime effect in the blocked,[7] $F(2, 416.14) = 30.17$, $p < .001$, $\eta_p^2 = .114$, than in the mixed context, $F(2, 231.79) = 21.59$, $p < .001$, $\eta_p^2 = .149$ (see Figure 7 for mean proportions). Simple effects analyses on the prime effect for the blocked contexts revealed no significant difference in threat judgments following Black vs. White primes, $F(1, 236) = .42$, $p = .515$, $\eta_p^2 = .002$, 95% CIdiff = [–.04, .02]. In contrast, the mixed context showed standard stereotyping effects, such that Black primes led to a greater proportion of more threatening judgments than White primes, $F(1, 123) = 9.26$, $p = .003$, $\eta_p^2 = .070$, 95% CIdiff [.03, .13].

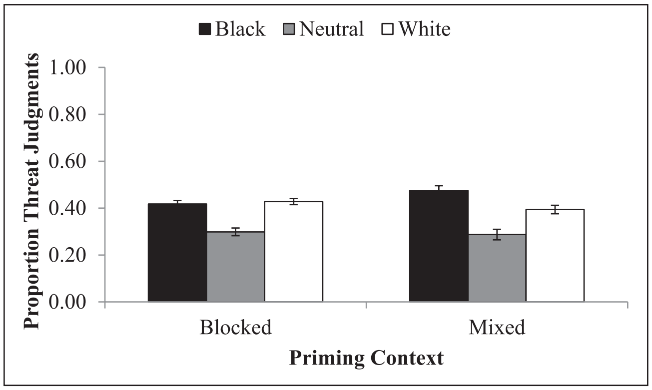

Figure 7. Proportion of threat judgments as a function of priming context and prime in Experiment 3.
Note. Error bars represent standard error of the mean.

Table 10. SMT Model Parameter Estimates [and 95% CIs] by Priming Context.

	Experiment 3	
	Blocked	Mixed
SAC	0.60 [.57, .64]	0.67 [.63, .72]
SAP	0.49 [.48, .50]	0.56 [.54, .57]
D	0.11 [.09, .12]	0.13 [.11, .15]
G	0.27 [.26, .28]	0.25 [.24, .27]

Note. SMT = stereotype misperception task; CI = confidence interval; SAC = stereotype activation; SAP = stereotype application; D = target detection; G = guessing.

Modeling results. As in previous experiments, we aggregated the sums of the "more" and "less threatening" responses based on each of the SMT trial types for the two priming contexts. These sums were again used to estimate parameter estimates and model fits. We estimated a model to examine the processes underlying the effects of the priming context manipulation. The model fit well, $G^2(4) = 1.59$, $p = .811$, $w = .006$, suggesting that the model was appropriate to explain the data.

First, we compared the blocked and mixed contexts on the SAC parameter. Unlike the prior experiments, this revealed a significant difference between the two groups, $\Delta G^2(1) = 6.42$, $p = .011$, $w = .011$, indicating that SAC estimates were higher in the mixed (SAC = .67; 95% CI = [.63, .72]), than the blocked context (SAC = .60; 95% CI = [.57, .64]). Next, we compared the contexts on the SAP parameter. As in the previous experiments, SAP estimates were higher in the mixed (SAP = .56; 95% CI = [.55, .57]), than in the blocked contexts (SAP = .49, 95% CI = [.48, .50]), $\Delta G^2(1) = 63.72$, $p < .001$, $w = .035$ (see Table 10 for parameter estimates).

Discussion

Experiment 3 extended the general findings of the prior experiments. In the mixed (high category salience) condition, we observed standard levels of stereotyping. In contrast, in the blocked (low category salience) priming context condition, stereotyping (the Black vs. White prime effect) was eliminated. Replicating the prior experiments, the mixed priming context showed greater SAP than the between-subjects context. Novel to Experiment 3 was the difference between salience conditions in SAC, in which stereotype activation was greater in the mixed than blocked condition.

General Discussion

Across all three experiments, we found that category salience moderated stereotyping, such that conditions of low category salience led to less stereotyping than high salience. Category salience was consistently associated with differences in SAP. Notably, in Experiments 1 and 2, which manipulated category salience fully within-subjects, SAC was equivalent in the low and high salience conditions. However, when category salience was manipulated between-subjects such that participants only saw primes presented in a low category salience condition (i.e., primes were always presented in a blocked context) or high salience condition, SAC was lower than in the low salience context. It seems that when prime race is not made salient by context, SAC is indeed lower than when categories are salient. When considered in light of the prior two experiments, these findings suggest that, once stereotypes have been activated in one context, they remain active in other contexts. If categories are made salient, stereotypes may become more accessible and continue to be so, even if categories are later made less salient. Thus, it appears that, as long as categories are made salient at some point during the task (i.e., in a mixed priming context), stereotypes may become active and maintain such activation, even carrying over into a low salience context (i.e., in a blocked priming context).

Theoretically, the findings regarding sensitivity of SAC are consistent with prior literature on the relationship between categorization and impression formation. For example, Brewer and Feinstein's (1999) dual process model of impression formation argues that people are judged based on initially salient and meaningful features in the environment, which can either promote category-based or person-based processing. Our findings comport with this model in that making categories salient at any point during the task (leading our participants to potentially take on a "categorical processing mode") led participants to use categories, regardless of whether the environment maintained such salience. Other models of person perception such as the continuum model (Fiske, Lin, & Neuberg, 1999) and the categorization and individuation model (Hugenberg, Young, Bernstein, & Sacco, 2010) both posit that people should process social categories initially in person perception and only avoid stereotypes if motivated to do so. Accordingly, our findings indicate that people are especially likely to use categories when the environment makes them salient and, lacking a motivational reason to process other information, categories and stereotypes will continue to be active. As a result, stereotypes may carry over between contexts to a greater extent than has sometimes been recognized. This could contribute to phenomena such as moral licensing (Monin & Miller, 2001), in which people who initially express disapproval of stereotypes subsequently render more stereotypic judgments than people who do not initially express such disapproval.

Our findings regarding the context sensitivity of SAP are consistent with prior theorizing and also extend such work. In particular, it has often been proposed that SAP should be easier to intentionally manipulate than SAC (Devine, 1989; Fazio et al., 1995). Supporting this idea, we found that the extent of SAP depended on category salience. Specifically, stereotypes were applied more when categories were salient than when they were not. Although SAC also was sensitive to category salience in Experiment 3, it was not in Experiments 1 and 2 in which the manipulation of salience was less clean. This suggests that SAC may be less reactive to context than SAP, which, presumably, can be more easily intentionally modified. Given these findings, our interpretation of the relationship between salience and application is that salience leads to an increase in the availability of categorical and stereotypic information. As such, the more salient the information is, the more likely it should be to be used. In addition, salience may also act as a cue to the relevance of categories to judgment, leading people to apply stereotypes more or less.

The current work underscores the importance of employing process modeling to better understand psychological phenomena. Previous research used different measures to assess SAC and SAP. As a result, any observed differences may reflect differences in the nature of the tasks rather than differences in activation versus application, per se. Multinomial processing tree models such as the SMT allow researchers to measure multiple processes from outcomes on a single task, thereby removing task variance as a potential explanation for observed differences in processing. Using the SMT model, we found that SAP is more responsive to salience than might have been assumed. In particular, salience affected application even when it did not affect activation. We also observed that the effects of salience on activation extend across contexts. The precision achieved with modeling also allows researchers greater insight into how to reduce stereotyping. Specifically, a better understanding of the antecedents and consequences of SAC and SAP facilitates our ability to design effective interventions to reduce both processes.

Although models such as the SMT can provide valuable information about how variables such as salience influence stereotyping processes, they cannot speak to the temporal relationships between them. The model is specified in terms of how processes constrain each other, but not in terms of temporal order. Thus, although SAC precedes SAP in the model tree, it is possible that aspects of SAP begin to unfold before the full extent of SAC is determined. But, regardless of the temporal relationship between SAC and SAP, the extent of SAP is constrained by whether or not SAC has occurred. Additional research using techniques capable of measuring the time course of processes would be needed to understand the temporal relationships among categorization, SAC, and SAP.

A limitation of the current research is that only social category information was varied and, as such, may have been the only information that seemed relevant for participants. It is possible that introducing additional individuating information about targets might influence the extents of SAC and SAP. For example, introducing facial expressions or varying the gender of primes might lead to a reduction in activation of race stereotypes. Future research should more fully examine the manner in which categories, stereotypes, and individuating information influence one another and the extents of SAC and SAP.

Appendix

Additional SMT Effect Results

Experiment 1: Prime × context simple effects for neutral primes. Within the blocked context, Black primes led to a greater proportion of threat judgments than neutral primes, $F(1, 146) = 39.39, p < .001, \eta_p^2 = .21$. White primes also led to a greater proportion of threat judgments than neutral primes, $F(1, 146) = 7.31, p = .008, \eta_p^2 = .05$. In the mixed condition, Black primes led to a greater proportion of threat judgments than neutral primes, $F(1, 146) = 59.85, p < .001, \eta_p^2 = .29$. In addition, White primes led to a greater proportion of threat judgments than neutral primes, $F(1, 146) = 4.20, p = .042, \eta_p^2 = .03$.

Experiment 1: Prime × target effects. There was a prime × target interaction, $F(2, 274.67) = 11.54, p < .001, \eta_p^2 = .073$. Simple effects indicated that this interaction was driven by a difference in magnitude in proportion of threat judgments given to the high versus low targets such that the difference between targets was the greatest following neutral primes, $F(1, 146) = 35.41, p < .001, \eta_p^2 = .195$, relative to White, $F(1, 146) = 13.78, p < .001, \eta_p^2 = .086$, and Black primes, $F(1, 146) = 9.07, p = .003, \eta_p^2 = .058$.

Experiment 2: Neutral prime × priming context × prime effects. To determine whether neutral primes impacted the effect of priming context on priming effects, we created a variable representing whether neutral primes were present or absent during blocks of the experiment (present = yes; absent = no). To investigate whether neutral primes interacted with priming context, we subjected the proportion of "more threatening" judgments to a 2 (presence of neutral primes: yes vs. no) × 2 (priming context order: blocked context first vs. mixed context first) × 2 (priming context: blocked vs. mixed context) × 2 (prime: Black vs. White) × 2 (prime set: low vs. high prototypic Black primes) × 2 (target: high vs. low threat) mixed-ANOVA. Unlike Experiment 1, this analysis revealed a three-way interaction between the presence of neutrals, priming context, and prime, $F(1, 138) = 4.65$, $p = .033$, $\eta_p^2 = .03$.

To better understand this effect, we examined the 2 (priming context: blocked vs. mixed context) × 2 (prime: Black vs. White) repeated-measures analyses of variance (ANOVAs) when the neutral primes were and were not present. When neutral primes were present, there was an interaction between context and prime, $F(1, 137) = 10.49$, $p = .002$, $\eta_p^2 = .07$. When neutral primes were absent, there was also an interaction between context and prime, $F(1, 137) = 26.31$, $p < .001$, $\eta_p^2 = .16$. Overall, the interaction suggests that priming context effects were somewhat stronger in the condition without neutral primes. Importantly, however, context still moderated the prime effect even when neutrals were present. As such, we felt that it was reasonable to analyze and report the results of trials where neutral primes were present in the main text.

Experiment 2: Prime × context simple effects for neutral primes. Within the blocked context, simple effects revealed that Black primes led to a greater proportion of threat judgments than neutral primes, $F(1, 138) = 89.84$, $p < .001$, $\eta_p^2 = .39$. White primes also led to a greater proportion of threat judgments than neutral primes, $F(1, 138) = 20.51$, $p < .001$, $\eta_p^2 = .13$. Within the mixed context, simple effects showed that Black primes led to a greater proportion of threat judgments than neutral primes, $F(1, 138) = 107.20$, $p < .001$, $\eta_p^2 = .44$. White primes also led to a greater proportion of threat judgments than neutral primes, $F(1, 138) = 12.08$, $p = .001$, $\eta_p^2 = .08$.

Experiment 2: Prime × target effects. Similar to experiment 1, there was a prime × target interaction, $F(2, 226.47) = 8.73$, $p < .001$, $\eta_p^2 = .060$. Simple effects indicated that this interaction was driven by a difference in magnitude in proportion of threat judgments given to the high vs. low targets such that the difference between targets was the greatest following neutral, $F(1, 138) = 53.88$, $p < .001$, $\eta_p^2 = .281$, relative to Black, $F(1, 138) = 13.68$, $p < .001$, $\eta_p^2 = .090$, and White primes, $F(1, 138) = 13.45$, $p < .001$, $\eta_p^2 = .089$.

Experiment 2: Additional modeling results. There was no effect of priming context on the D parameter, $\Delta G^2(1) = .06$, $p = .813$. Similarly, there was no effect of priming context on the G parameter, $\Delta G^2(1) = .24$, $p = .621$.

Experiment 3: Block order effect analysis. Unexpectedly, within the blocked context the effect of priming context differed depending on whether White or Black primes were presented first, $F(2, 416.14) = 3.90$, $p = .025$, $\eta_p^2 = .016$. When Black primes were presented first there was a prime main effect, $F(2, 209.48) = 24.21$, $p < .001$, $\eta_p^2 = .18$. Simple effects analyses revealed that in this context, Black primes led to a lower proportion of more threatening judgments than White primes, $F(1, 114) = 5.98$, $p = .016$, $\eta_p^2 = .050$, but Black primes led to a greater proportion of more threatening judgments than neutral primes, $F(1, 114) = 16.14$, $p < .001$, $\eta_p^2 = .124$. White primes also led to a greater proportion of more threatening judgments than neutral primes, $F(1, 114) = 54.59$, $p < .001$, $\eta_p^2 = .324$.

When White primes were presented first, there was also a prime main effect, $F(2, 191.83) = 10.77$, $p < .001$, $\eta_p^2 = .08$, however, in this case, Black primes led to a marginally greater proportion of more threat judgments relative to White primes, $F(1, 121) = 3.40$, $p = .068$, $\eta_p^2 = .027$, and significantly more than neutral primes, $F(1, 121) = 16.84$, $p < .001$, $\eta_p^2 = .122$. White primes also led to more threat judgments than neutral primes, $F(1, 121) = 7.93$, $p = .006$, $\eta_p^2 = .062$.

Experiment 3: Prime × target effect. Just as in Experiments 1 and 2, there was a prime × target interaction, $F(2, 656.25) = 25.72$, $p < .001$, $\eta_p^2 = .067$. Simple effects indicated that this interaction was driven by a difference in magnitude in proportion of threat judgments given to the high vs. low targets such that the difference between targets was the greatest following, Neutral $F(1, 360) = 125.25$, $p < .001$, $\eta_p^2 = .258$, relative to Black, $F(1, 360) = 26.04$, $p < .001$, $\eta_p^2 = .067$, and White primes, $F(1, 360) = 42.15$, $p < .001$, $\eta_p^2 = .105$.

Experiment 3: Additional modeling results. There was no effect of priming context on the D parameter $\Delta G^2(1) = 1.82$, $p = .178$. There was a marginal effect of priming context on the G parameter, $\Delta G^2(1) = 3.82$, $p = .051$, suggesting that participants guessed "more threat" more often in the blocked, than in the mixed priming context.

Authors' Note

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Supplemental Material

Supplemental material is available online with this article.

Notes

1. In Experiment 1A, n = 37. In Experiment 1B, n = 113. Experiments 1A and 1B were identical in design and results. For ease, we report the results of both experiments together. Experiment 1B was a preregistered replication of Experiment 1A. This experiment and the others reported in the article were posted on Open Science Framework (Open Science Collaboration; available at: osf.io/c9kqw).
2. Given that we were conceptually replicating a manipulation used in Macrae and Cloutier (2009), we were concerned about potential differences between the two studies. In particular, whereas Macrae and Cloutier (2009) only used two prime types (male vs. female), the SMT uses three (Black vs. neutral vs. White). To test whether the inclusion of neutral primes influenced the priming context effect, we only included neutral primes on half of all trial types. In the blocked context, there were 40 trials of White and Black primes presented alone, and another set of 40 Black and White primes that were presented with 20 neutral primes. Within the mixed context, there were 80 Black and White prime trials, and another set of trials with 120 Black, neutral, and White primes presented. See Figure 1 for a visual representation of all block types.
3. Analyses reported in the main body of the article are conducted only on trials presented with neutral primes. The SMT model requires neutral primes to estimate model parameters and, as such, reporting the analysis of variance (ANOVA) results for the data that were modeled ensures that the stereotyping and modeling results are based on the same data. For clarity, in the main body of the article, we only report the prime simple effects of interest: The comparison between Black and White primes. Full decomposition of the prime simple effects involving neutral primes for all experiments can be found in the appendix.In Experiments 1 and 2, we conducted analyses that examined the effect of neutral primes on the priming context effect. In Experiment 1, neutral primes did not moderate the effect of priming context on stereotyping. In Experiment 2, neutral primes somewhat attenuated but did not eliminate the effect of priming context. Details for all analyses related to neutral primes are reported in the appendix.
4. In addition to the SMT, we also ran several analyses examining model fit for alternative models. First, we tested a model in which detection of the target trait comes first and stereotype activation (SAC) follows the failure of target detection (d-SMT). We also tested a process dissociation plus guessing model (PDg). This model is identical to the standard PD model in that control (C) comes first and, at the failure of C, association activation (A) may drive behavior. In the absence of A, responses will be driven by a response bias (G) to select either more or less threat. As Table 2 indicates, across all three experiments and for all three model fit indices, the SMT had the least misfit (i.e., best model fit) of the three models. Thus, we focus our discussion of the modeling results for all three experiments on the SMT.
5. Because the G and D parameters are not consistently impacted by the priming context manipulation and cannot account for the pattern of results observed in the stereotyping data, we report all subsequent results for these parameters in the appendix.
6. Greenhouse-Geisser corrections applied for violations of sphericity on the prime variable.
7. Within the blocked context, there was an unexpected effect of prime race order, $F(2, 416.14) = 3.90, p = .025, \eta_p^2 = .016$. We did not anticipate that the blocked contexts would differ based on which prime race was presented first and, as such, we report the full decomposition of this effect in the appendix.

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