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The Blond, The Dumb and the Ugly: Does Self-Stereotyping Mediate Prime-to-Behavior Effects?

Clémentine Bry
Université de Savoie
Fabrice Gabarrot
Université Blaise Pascal
Claudia Toma
Université catholique de Louvain

Prime-to-behavior effects are hypothesized to result from prime-related changes in the self-concept. We tested whether both assimilation and contrast would occur after prime-congruent and prime-incongruent changes in the self-concept. We showed that blond stereotype priming and self-construal interact to influence self-stereotyping and intellectual performance. Independent-blond primed participants displayed a contrast effect as they self-stereotyped less and performed better whereas interdependent-blond primed participants did not display a significant assimilation effect. Analyses did not support the mediating role of self-stereotyping. We discuss the implications of these results for prime-to-behavior mechanisms.

Stereotype priming can influence behavior in either a stereotype-consistent way (e.g., performing better on a knowledge test after being primed with the professor stereotype) or in a stereotype-inconsistent way (e.g., performing worse on a knowledge test after being primed with the professor stereotype, see Schubert & Häfner, 2003). Several mechanisms have been proposed to explain these effects, notably a mediation through the self-concept (for a review see Wheeler & DeMarree, 2009). Indeed, recent papers showed that self-evaluation mediated priming effects on behavior (e.g., Galinsky, Wang, & Ku, 2008; Hansen & Wänke, 2009). However, these papers provided evidence of mediation only for assimilation effects (i.e., congruent with the prime). In the present paper, we investigate whether priming triggers assimilation and contrast effects on both self-evaluation and behavior and whether self-evaluation mediates behavior.

Prime-to-Behavior Effects

Earlier accounts of prime-to-behavior effects proposed a direct, unmediated, link between perception and action (See for instance, Bargh & Chartrand, 1999; Bargh, Chen, & Burrows, 1996; Bargh & Ferguson, 2000; Dijksterhuis & Bargh, 2001). Perception can be directly translated into action because perception and action share the same underlying set of mental representations (See Prinz, 1990). For example, Bargh et al. (1996) showed that the subliminal activation of the African-American stereotype led participants to behave more aggressively, an assimilation effect to the stereotype content. However, this explanation does not hold for contrast effects (i.e., opposite to the primed content). Contrast effects seem to be often driven by self-concept related factors. Numerous self-related factors like self-prime comparison (Dijksterhuis et al., 1998); salience of the self (Dijksterhuis & van Knippenberg, 2000; Schubert & Häfner, 2003); self-consciousness (Hull, Slone, Meteyer, & Matthews, 2002; Wheeler, Morrison, DeMarree, & Petty, 2008); ingroup identification (Hall & Crisp, 2008); self-monitoring (DeMarree, Wheeler, & Petty, 2005) or self-focused attention (DeMarree & Loersch, 2009) were found to moderate assimilation and contrast effects (For a review see Smeesters, Wheeler, and Kay, 2010). These results were summarized in the active self account (Wheeler, DeMarree, & Petty, 2007) which predicts that priming could induce changes in the active self-representations. Depending on moderators, priming induces prime- consistent or inconsistent changes in the self-concept, and thus prime-consistent or inconsistent behaviors. In the present study we focus on the moderating role of self-construal (Markus & Kitayama, 1991).

Self-Construal

Self-construal refers to an individual's representation of the self in relation to others. The self and others can be construed as independent, distinct, and autonomous or as interdependent, related and connected (Markus & Kitayama, 1991). Self-construal is a construct developed in cross-cultural psychology (Markus & Kitayama, 1991; Singelis, 1994) to differentiate Western from non-Western cultures but it can also be used to differentiate individuals within the same culture (Brewer & Gardner, 1996). Both types of self-construal would co-exist within one individual and can separately be activated by subtle cues (Gardner, Gabriel, & Lee, 1999; Singelis & Brown, 1995).

Self-construal influences several cognitive processes and their outcomes (for a review

see Cross, Hardin, & Gercek-Swing, 2011). Independence leads to emphasize internal and private attributes like competences, attitudes, and feelings whereas interdependence leads to emphasize external and public attributes like relations, status and roles (Markus & Kitayama, 1991). Interdependent people are more context-dependent (Kühnen, Hannover, & Schubert, 2001), process information more holistically (Masuda & Nisbett, 2001), prefer rounded shapes (Zhang, Feick, & Price, 2006) and respect a non-redundancy norm in conversations (Haberstroh, Oyserman, Schwarz, Kühnen, & Ji, 2002), to a larger degree than independent people. Self-construal also influences perceived similarity with others, interdependence leading to more similarity than independence (Kühnen & Hannover, 2000), and mindsets, interdependence activating an integration mindset and independence activating a differentiation mindset (Stapel & Koomen, 2001).

Self-construal moderates the effect a target can have on one's own self-evaluation (Kemmelmeier & Oyserman, 2001a, 2001b; Kühnen & Hannover, 2000; Stapel & Koomen, 2001). For instance, Kemmelmeier and Oyserman (2001b) measured independence and interdependence before asking half participants to generate an upward comparison target (i.e., a successful fellow student of their own gender). The other half did not complete the comparison task. Participants evaluated their school performance. High-interdependent participants were more satisfied with their own academic achievement whereas low-interdependent participants were less satisfied, compared to control. Stapel and Koomen (2001) added to the previous demonstration by manipulating independence vs. interdependence vs. control and presenting a positive or a negative comparison target. Namely, student participants were presented with a successful or unsuccessful psychology student from their university. When the target was unsuccessful, independent participants displayed contrast, leading to a positive self-evaluation, compared to control or interdependent participants. When the target was successful, interdependent participants displayed assimilation, leading to a positive self-evaluation, compared to independent and control participants. In sum, for self-evaluation, interdependence favors assimilation to the target, notably when it is positive whereas independence favours contrast from the target, notably when it is negative.

Self-Construal and Prime-to-Behavior Effects

Based on the active-self account (Wheeler et al., 2007) and findings regarding the influence of self-construal on social comparison, Bry, Follenfant and Meyer (2008) hypothesized that interdependent and independent self-construal could moderate priming effects on the self-concept and result in behavioral assimilation and contrast effects, respectively. In two studies, interdependent (vs. independent) participants performed lower (vs. higher) on a knowledge test when primed with the blond stereotype (i.e., the popular view of blond-haired women as being attractive, popular, gullible and unintelligent) compared to a control prime condition. These studies are among the few that showed clear assimilation and contrast effects with a negative prime.

The moderation of prime-to-behavior effects by self-construal seems very congruent with those obtained on self-evaluation (e.g., Stapel & Koomen, 2001), and with the active-self account (Wheeler et al., 2007). However, no mediation was tested in Bry et al. (2008).

The active-self account proposes that priming a stereotype can temporarily affect the very content of the active-self, leading to the integration/exclusion of prime features

into/from the self which in turn triggers the subsequent prime-consistent/inconsistent behavior (Wheeler et al., 2007). Recently, Hansen and Wänke (2009) showed that self-efficacy beliefs mediate stereotype-priming effects on knowledge and motor performance. Similarly, Galinsky et al. (2008) established that perspective-taking leads to the inclusion of stereotypes of others in the self and to behavior in line with this self-content. In one of their studies they showed that self-rating (influenced by stereotype priming) mediates perspective- taking effect on behavior. These results support the active-self account in the sense that assimilation effects would be mediated by prime-congruent changes in the active self. However, the active-self account argues that contrast effects should also be mediated by prime-incongruent changes in the active self. This part of the model was tested neither by Hansen and Wänke (2009) nor by Galinsky et al. (2008).

The purpose of the present paper is twofold. First, we aimed to replicate the moderation of priming effects by self-construal on performance found by Bry et al. (2008) and to extend it to self-stereotyping[1]. Accordingly, we expected a significant interaction between self-construal and priming on both knowledge performance and self-stereotyping. Second, we aimed to test self-stereotyping as a mediator of the interaction of self-construal by priming on performance.

Method

Participants and Design

Ninety-three volunteers (52 females, 41 males, Mage = 28.8, *SD* = 6.8) were randomly assigned to one of the four experimental conditions of a 2 (priming: blond vs. control) by 2 (self-construal: independent vs. interdependent) between-participants design. Among these volunteers, thirteen declared being blond. Participants' gender and hair color did not correlate with or have significant main or interaction effects on knowledge performance or on self-stereotyping so these variables were discarded from the analyses. However, age did have significant main effects[2], notably on knowledge performance, as such, we included this variable in all analyses and reported in footnotes when significant.

Procedure and Stimulus Material

Our procedure and material were similar to Bry and colleagues (2008). Participants were recruited through advertising messages posted on Internet newsgroups and invited to participate online in four purportedly independent psychology studies.

Self-construal manipulation. The first task was presented as a questionnaire dealing with personality at work and leisure and actually consisted of the self-construal manipulation. On a seven-point scale (from 1 = "not at all" to 7 = "very much") participants

1 We thank an anonymous reviewer for pointing out that our conceptualization of self-stereotyping differs from classic ones. We use the term self-stereotyping as the inclusion of stereotypical features in the self, independently from group membership.

2 Analyses without age provided similar results, interactions were significant as expected. However, because of its significant effect on knowledge performance, we included age as a covariate. Age had a significant main effect on knowledge performance, $t(88) = 2.24$, $p = .027$. Age had no significant effect on self-stereotyping. The main effect of age remained significant in the mediated moderation analysis, $t(86) = 2.47$, $p = .015$.

rated how self-describing were seven items related to independence (vs. interdependence). These items were adapted from Oyserman, Coon and Kemmelmeier (2002, Table 1) and biased with a low frequency adverb (i.e., I *sometimes* adapt my behavior to those around me; I *sometimes* think that I am unique, different from others on several aspects). This procedure leads participants to activate and admit only the related cognitions as self-descriptive (See Chaiken & Baldwin, 1981). Each item was presented twice, first for work situations and second for leisure situations.

Priming task. The second task was presented as a color perception study and allowed us to introduce the implicit priming manipulation. Participants were exposed to thirty portraits for which they had to determine the hair color on a four-color scale. In the Blond priming condition, 21 pictures were of blond women and 9 were of darker-haired women. In the control condition, we tried to respect the proportions of the general population in terms of gender and hair color. There were 15 men and 15 women mostly dark-haired, only two men and two women were blond.

Self-stereotyping. The third task consisted of the self-stereotyping measure. Participants rated how they currently felt about themselves on 10 traits, from 1 = "not at all", to 7 = "very much". A pilot study revealed that these traits were either stereotypical (i.e., extroverted, open, superficial, and ignorant) or counter-stereotypical (i.e., ingenious, knowledgeable, ugly, reserved, thrifty and natural) of blonds. We averaged ratings for each category. The score of self-stereotyping was computed by subtracting the counter-stereotypical mean from the stereotypical mean. The higher the score, the more the participants self-describe in stereotypical terms.

Knowledge test. The fourth task consisted of a knowledge test. Participants were presented with a set of twenty questions assessing general knowledge. For each question, they were asked to choose the correct answer among three possible answers, without any help. Questions were distributed in three difficulty levels (easy, medium and difficult). We computed a global performance index and a performance index for each difficulty level by summing the number of correct answers. However we report analyses only for the difficult questions (results for other indexes in footnote[3]).

Eventually, participants were asked for demographic information and carefully checked for awareness before they were thanked and thoroughly debriefed.

Results

Our dependent variables (i.e., self-stereotyping and knowledge performance) were separately regressed on priming (blond priming coded 1 and control priming coded -1), self-construal (interdependence coded 1 and independence coded -1), their interaction, and age (centered).

3 When we used the total number of correct answers as DV, we only found a main effect of priming, such that participants primed with the blond stereotype performed better than control, $b = .63$, $t(88) = 2.20$, $p = .03$. For the ten easy questions (answered correctly by more than 50% of the sample), we found no significant effect. For the five medium questions (answered correctly by 40 to 50% of the sample), we found a main effect of priming, $b = .33$, $t(88) = 2.98$, $p < .01$ and a marginal effect of self-construal, $b = -.22$, $t(88) = -1.95$, $p < .06$. It appears that participants primed with the blond performed better than control and that participants primed with an independent self-construal performed better than interdependent counterparts. These two main effects are reflected in the interaction found on the difficult questions.

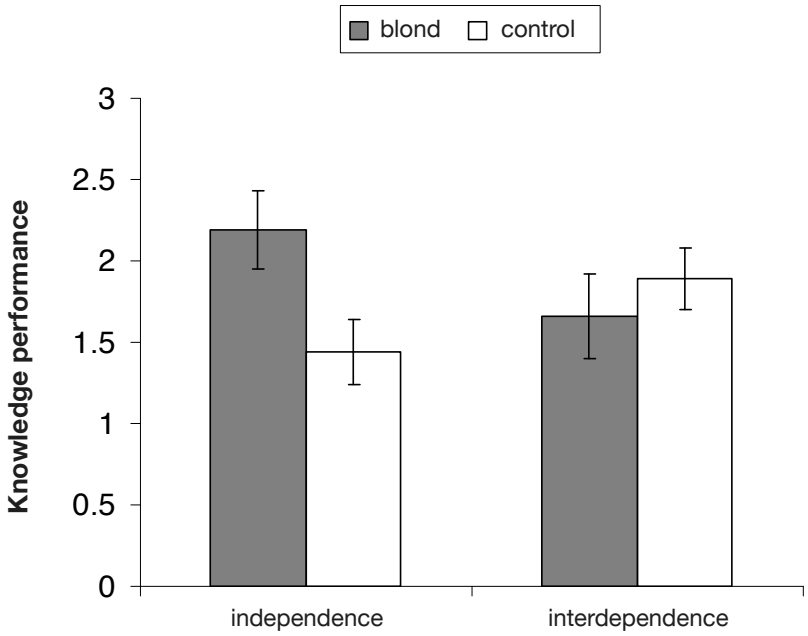

Figure 1: *Means and standard errors of knowledge performance as a function of priming (Blond vs. Control) and self-construal (Independence vs. Interdependence)*

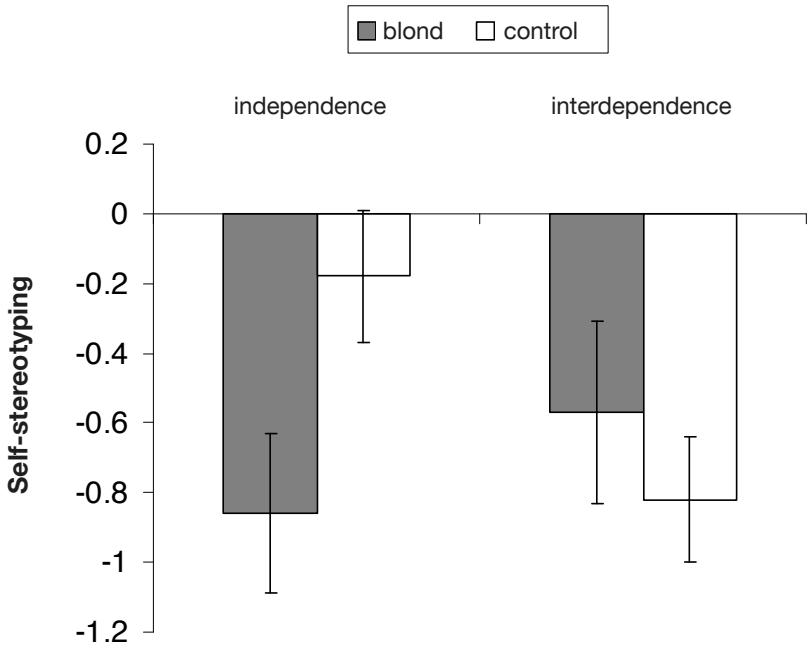

Figure 2: *Means and standard errors of self-stereotyping as a function of priming (Blond vs. Control) and self-construal (Independence vs. Interdependence)*

Knowledge Performance

The self-construal by stereotype priming interaction was significant, $t(88) = -2.16$, $p = .034$, $\eta_p^2 = .047$. Participants primed with independence and the blond stereotype ($M = 2.19$, $SE = .24$) performed better than the control group ($M = 1.44$, $SE = .20$), $t(88) = 2.37$, p = .02. Participants primed with interdependence and the blond stereotype ($M = 1.66$, $SE = .27$) performed worse than the control group ($M = 1.89$, $SE = .19$), though non-significantly, $t(88) < 1$, *ns*. We found the expected contrast effect among independent participants but not the assimilation effect among interdependent participants though the pattern was as predicted.

Self-Stereotyping

The analysis revealed the expected significant interaction of priming and self-construal on self-stereotyping, $t(88) = 2.13$, $p = .036$, $\eta_p^2 = .048$. Independence-blond primed participants ($M = -.86$, $SE = .23$) self-stereotyped less than control-primed counterparts ($M = -.18$, $SE = .19$), t (88) = -2.28, $p = .025$. Interdependence-blond primed participants ($M = -.57$, $SE = .26$) self-stereotyped not-significantly more than control- primed counterparts ($M = -.82$, $SE = .18$), $t(88) < 1$, *ns*. We found a significant contrast effect among independent participants but not the assimilation effect among interdependent though the pattern was as predicted. It appears that participants perceive themselves in a self-serving way, displaying contrast from a negative prime when in an independent self-construal but not assimilating significantly to the negative prime when in an interdependent self-construal.

Mediated Moderation

We then tested a mediated moderation process, following Muller, Judd and Yzerbyt (2005). The first two steps of the mediated moderation analysis, namely the regression of the outcome variable (i.e., performance; Step 1) and the mediator (i.e., self-stereotyping; Step 2) on the treatment variable (i.e., priming), the moderator (i.e., self-construal) and their interaction are presented above.

For a mediated moderation to occur, the self-construal by priming interaction effect on knowledge performance found in the first step should be reduced once we control for self-stereotyping (i.e., the mediator). Moreover self-stereotyping or self-construal by self-stereotyping interaction effects should be significant. We thus regressed performance on age, priming, self-construal, self-stereotyping, self-construal by priming interaction and self-construal by self-stereotyping interaction[4]. We report confidence intervals of parameters.

The priming by self-construal interaction remained significant when we controlled for self-stereotyping and self-construal by self-stereotyping interaction, $t(86) = -2.32$, $p = .023$, $\eta_p^2 = .053$. Self-stereotyping had no main effect on performance, $t(86) = 1.58$, $p = .12$, 95% *CI* = [-.045; .393], and no interactive effects with self-construal on performance, $t(86) = 1.50$, $p = .14$, 95% *CI* [-.054; .385].

4 We tested several alternative mediated moderation and moderated mediation models. The results provided no support for these models. Moreover, as recommanded by Preacher, Rucker and Hayes (2007), we also used bootstrapping to test a mediated moderation, but this method did not reveal any mediation effect, thus for simplicity's sake, we presented regression analyses.

Post-hoc Power Analysis

Because we failed to find a significant mediation effect, we wanted to test whether we had secured enough power. Using the GLM Univariate module of SPSS 17, we computed the custom model of mediation and asked for the effect size and the observed power for *p* values = .05. The total power of the mediation analysis is .85. The power for the interaction of self-construal by prime is .63. The power of the effect of self-stereotyping on performance is .34 (for $p = .12$, observed power = .51) and the power of the interaction between self-construal and self-stereotyping is .32 (for $p = .14$, observed power = .51). The observed powers of our mediation are thus medium. It is possible (but in our opinion unlikely) that mediation effects require more power to be detected.

Discussion

The active self account posits that prime-to-behavior effects are the results of priming effects on the self-concept and that behavior follows the self-concept (Wheeler et al., 2007). In this study, we tested whether self-construal would moderate priming effects on both self-stereotyping and behavior and whether self-stereotyping mediated behavioral effects.

As expected, we found significant interaction effects between self-construal and stereotype priming on both self-stereotyping and performance. In the interdependence condition, we hypothesized assimilation effects: participants primed with blonds were to self-stereotype more and perform worse than control participants. Though the pattern was consistent with our hypotheses on both self-stereotyping and performance, the assimilation effects were not significant. In the independence condition, we hypothesized and found contrast effects: participant primed with the blond stereotype self-stereotyped less and performed better than control participants. Our study partially supports our hypotheses. Priming effects are similar on self-concept and behavior. Contrast effect found on behavior is also found on self-concept. It is worth emphasizing that, in several studies, self-construal did not moderate assimilation and contrast, but modified participants' self-evaluation in a self-serving way (e.g., Kemmelmeier & Oyserman, 2001b; Stapel & Koomen, 2001). For instance, Stapel and Koomen (2001) found a significant contrast effect from a negative target when people were independent, but no assimilation effect when interdependent, and a significant assimilation effect to a positive target when people were interdependent, but no contrast effect when independent. We believe our participants displayed such a self-serving bias and did not assimilate to a negative prime like the blond stereotype. Stapel and Koomen (2001) specified that the self-serving use of social information was especially strong when the focal dimension was perceived as important and diagnostic for future performance. We believe our self-stereotyping measure addressed such important and diagnostic dimensions which again would explain why we did not obtain significant assimilation effects. But more importantly, we were not able to find a significant mediation effect of performance through self-stereotyping.

It is plausible that we lacked power to show such mediation. However effect sizes are consistent with what is usually found with priming effects (see for instance Bry et al., 2008), the sample size is reasonably large and the observed statistical power for the mediation effects is medium (observed power >.30). Postulating that we had enough power, we can think of

two reasons why we did not find the expected mediation effect. First, priming effects in our study took a direct road from the prime to the behavior and another independent road from the prime to self-evaluation. This would be consistent with the road map model proposed by Wheeler and DeMarree (2009). Second, the mediation effect requires that "mindsets" but not self-cognitions are activated. Indeed Stapel and Koomen (2001) found there was less self-serving bias in self-evaluation when a mindset (differentiation or integration) rather than a self-cognition (independence or interdependence) was activated. In Galinsky et al. (2008), perspective-taking was measured or manipulated and moderated the priming effect on self-evaluation (which mediated effects on behavior). Perspective-taking is a mindset more than a self-cognition. In Hansen and Wänke (2009), no self-cognition was activated. As such, it is possible that activating a self-cognition would impair the mediation through the self, whereas manipulating a mindset would help the mediating mechanism to occur. Dijksterhuis and van Knippenberg (2000) showed that self-awareness impaired priming effects. It is thus plausible that self-construal, being not only a mindset but above all a self-cognition, impaired the mediating mechanism, as people would be self-aware. Future research should investigate this path, and secure more evidence about the mediating mechanism of prime-to-behavior effects.

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Correspondence should be addressed to:
Dr Clémentine Bry
Université de Savoie
Laboratoire inter-universitaire de Psychologie
BP 1104
73000 Chambéry cedex
France

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