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Article

Subliminal Gender Stereotypes: Who Can Resist?

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Abstract

We examine women's responses to subliminal gender stereotypes, that is, stereotypes present outside conscious awareness. Previous research suggests that subtle stereotypes elicit acceptance and assimilation, but we predict that subliminal exposure to gender stereotypes will trigger resistance in some women. Specifically, we expect resistance to occur among women who are relatively strongly identified with feminists, but not with the broader group of women. We predict that resistance takes the form of persistence in stereotypically masculine domains and (implicit) in-group bias. Indeed, we found that subliminal exposure to stereotypes (vs. counter-stereotypes) led women who identify relatively strongly with feminists, but less strongly with women, to (a) persist in a math task, (b) show increased willingness to sacrifice men in a Moral Choice Dilemma task, and (c) show implicit in-group bias on an evaluative priming task. This evidence of resistance suggests that members of devalued groups are more resilient than previously thought.

Keywords

subliminal stereotypes, resistance, social identity, identification with feminists, identification with women

Explicit stereotypes and prejudice are increasingly rejected, but at a more subtle level they persist and shape social interactions (Barreto, Ellemers, Cihangir, & Stroebe, 2009; Pearson, Dovidio, & Gaertner, 2009; Swim, Aikin, Hall, & Hunter, 1995). Although people are motivated to defend themselves against such threats to their group identity (Barreto, Ellemers, Scholten, & Smith, 2010; Steele, Spencer, & Aronson, 2002), subtle forms of stereotyping are more difficult to recognize and their effects are harder to combat than those of explicit stereotypes (Barreto et al., 2009; Kray, Thompson, & Galinsky, 2001). Indeed, previous research has shown that exposure to subtle stereotypes often elicits stereotype assimilation, for instance leading women to adopt more submissive bodily postures (de Lemus, Spears, & Moya, 2012) and request more dependency-oriented help (Shnabel, Bar-Anan, Kende, Bareket, & Lazar, 2015). In this research, we examine factors that nevertheless allow women to *resist* social identity threat arising from subliminal stereotype exposure. This is important because it implies that disadvantaged groups have more scope to resist identity threat than previously thought.

Resistance to subliminal social identity threat might be conceived of as functioning like resistance in the physical immune system (vanDellen, Campbell, Hoyle, & Bradfield, 2011), fighting disease without the individual's awareness or conscious intervention. Analogously, in this research we aim to demonstrate that conscious awareness is not needed for resistance and, as such, that disadvantaged groups have a greater ability to contest social devaluation than previously thought. There are two central reasons why we believe resistance to subliminal gender stereotypes is possible, although previous research has shown that subliminal stereotype exposure leads to assimilation and internalization. First, resistance to subliminal stereotypes might be specific to certain group members. In the case of gender, feminist identification is particularly relevant because it has been shown to predict perceptions of gender inequality, activism, and politicization (Becker, Tausch, Spears, & Christ, 2011; Liss, Crawford, & Popp, 2004; Simon & Klandermans, 2001). Crucially for the current study, in a recent paper van Breen, Spears, Kuppens and de Lemus (2017) examined women's attitudes toward gender stereotypes across four studies. As would be expected, stronger identification with feminists was associated with rejection of gender stereotypes. However, not all feminist

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identifiers objected equally strongly to such stereotypes. The effect of feminist identification depended on a second identity dimension, namely, identification with women as a broader social group (Henderson-King & Stewart, 1994). Identification with women is related to satisfaction with being a woman, perceived femininity of the self, and, importantly, self-stereotyping (Chen, Chen, & Shaw, 2004; Leach et al., 2008; van Breen, et al. 2017). Chen et al. (2004) showed that, when asked to list traits typical of their group, strongly identified and weakly identified women listed identical traits, but those who were strongly identified were more likely to use these traits to describe themselves. It stands to reason, then, that the motivation to resist stereotypes is stronger among feminists for whom self-stereotyping is less important (or even aversive) to their self-concept, that is, feminists who are less strongly identified with women as a social group. Indeed, objections to gender stereotypes were found to be strongest when identification with feminists is high but identification with women is relatively low (van Breen et al., 2017). When considering subliminal stereotypes specifically, research has shown that general concern with sexism increases sensitivity to subliminal instances thereof (Kaiser, Vick, & Major, 2006). Taken together, these findings suggest that women who are strongly identified with feminists, but less with women as a group, will be chronically motivated to confront gender stereotypes, which may in turn enable them to resist when stereotypes are present outside of conscious awareness.

A second reason why we believe resistance to subliminal gender stereotypes is possible is that we argue that resistance can take place not only through overt and direct strategies but also through more subtle strategies. It is perhaps unlikely that exposure to *subliminal* cues would trigger very direct forms of resistance, such as protesting behavior or expressions of anger, given that participants are not consciously aware of the cues to which they have been exposed. In the current research, however, we study more subtle resistance strategies. We define resistance as a motivational process that leads to responses that *counteract* social identity threat. Defined in this way, resistance is an identity management strategy (Spears, Jetten, & Doosje, 2001) that minimizes negative consequences and affirms positive identity. As such, resistance can include not only very direct strategies, such as expressions of anger or collective action (Barreto et al., 2010), but also more subtle and indirect strategies, such as tendencies to engage in counter-stereotypical behavior. For instance, exposure to gender stereotypes can lead women to engage in more masculine communication styles (von Hippel, Wiryakusuma, Bowden, & Shochet, 2011). Exposure to gender stereotypes can also trigger task persistence in counter-stereotypical domains. De Lemus, Spears, Lupiañez, Moya, and Bukowski (2018) found that exposure to stereotypical gender roles leads women to persist in a spatial reasoning task, thereby emphasizing the group's competence in the counter-stereotypical domain and "disproving" stereotypes. In addition, there is evidence that

exposure to stereotypes can, under some circumstances, lead to improved *performance* in counter-stereotypical domains (Bry, Follenfant, & Meyer, 2008; Gupta, Turban, & Bhawe, 2008; Hoyt & Blascovich, 2007; Inzlicht, Aronson, Good, & McKay, 2006; Kray et al., 2001). Moreover, resistance can occur through evaluative strategies such as in-group favoritism (Mullen, Brown, & Smith, 1992) or out-group derogation (Fein & Spencer, 1997). To the extent that gender stereotypes imply that men are valued over women (Ridgeway, 2001), in-group favoritism and out-group derogation can counteract this implication by emphasizing the value of women (in-group favoritism) or by devaluing men (out-group derogation).

Taken together, these findings of previous studies suggest that participants can resist stereotypes not only through their personal behavior but also by challenging intergroup relations. At the individual level, women might resist stereotypes by demonstrating that they (and by extension, their in-group) have counter-stereotypical attributes. At the intergroup level, women who are motivated to challenge the devaluation of their own group can do this either by boosting evaluations of the in-group (in-group favoritism) or by rejecting the advantaged position of the out-group (out-group derogation).

Crucially, resistance responses are internally motivated and spontaneous, rather than externally imposed. This differentiates resistance from processes like those demonstrated, for instance, in the Just-Say-No paradigm (Kawakami, Dovidio, Moll, Hermsen, & Russin, 2000), in which the repeated negation of stereotypes reduces their subsequent automatic activation. This mechanism of activating and deactivating associative links is cognitive, and imposed by the experimenter, rather than being internally motivated by the experience of identity threat. The concept of resistance can also be distinguished from related concepts such as reactance (Brehm & Brehm, 1981; Steindl, Jonas, Sittenthaler, Traut-Mattausch, & Greenberg, 2015). Reactance can be seen as a form of resistance that specifically addresses perceived threats to (individual) freedom. In the present case, we instead focus on threats to social identity based on valence and status, which occur at the group level (de Lemus, Spears, van Breen, & Telga, 2016; Ellemers, Spears, & Doosje, 2002).

The Current Research

Across four studies, we examine resistance to subliminal gender stereotypes. We expect that subliminal exposure to gender stereotypes (as opposed to counter-stereotypes) will trigger resistance, especially among those women who are relatively highly identified with feminists, but not with the broader group of women. In Studies 1 and 2, we focus on behavioral resistance strategies. In Studies 2 to 4, we focus on implicit strategies that might be used to resist subliminal stereotype exposure.

Studies 1 and 2: Behavioral Resistance

In Studies 1 and 2, we examine whether subliminal stereotypes can be resisted through behavioral strategies. We focus on measures of task performance, task persistence, and a behavioral measure of in-group bias. We expect that subliminal exposure to stereotypes (vs. counter-stereotypes) will trigger resistance, in the form of improved performance (1a) and persistence (1b) in counter-stereotypical domains. Moreover, we expect that subliminal stereotypes (vs. counter-stereotypes) will be resisted through in-group favoritism (2a) and out-group derogation (2b).

Method

Design. In these studies, female participants are exposed to subliminal (counter-)stereotypes. In addition to this manipulation, identification with feminists and identification with women are measured as independent variables. Outcomes measures are a math task, which assesses performance and persistence in a domain that is counter-stereotypical for women; an anagram task, which assesses performance and persistence in a domain that is more stereotypical for women; and a Moral Choice Dilemma (MCD) task, which assesses in-group bias. Data are analyzed using integrative data analysis (IDA) in which the samples from the two studies are pooled into a single analysis (Curran & Hussong, 2009).

Sample and power. Female participants were recruited from among University of Groningen students. Study 1 included 121 participants, with an average age of 19 years, ranging between 17 and 30 years. Study 2 included 256 participants, with an average age of 22 years, ranging between 17 and 47 years. Four participants from Study 2 had missing data on the identification variables and could not be included in the analyses presented below.

For the math task, the pooled sample included 358 participants ($N1 = 119$, $N2 = 239$). Two participants from Study 1 and thirteen participants from Study 2 had incomplete or missing data on this task; in the case of Study 2, this was due to an equipment error. Given $\alpha = .05$, an ANCOVA procedure applied to this sample can detect small-to-medium effect sizes in the range of $d = 0.30$ with a power of $1 - \beta = 0.81$ (Faul, Erdfelder, Lang, & Buchner, 2007).

The anagram task was included in Study 2 only. For the performance data ($N = 248$), this sample allows us to detect effect sizes in the range of $d = 0.36$ with a power of $1 - \beta = 0.80$ (Faul et al., 2007). Due to an equipment error (noted above), persistence data were saved for only 118 participants. Given $\alpha = .05$, sufficient power ($1 - \beta = 0.80$) on this measure was achieved only for effect sizes of $d = 0.52$ or larger.

For the MCD task, the pooled sample included 361 participants ($N1 = 118$, $N2 = 243$). Three participants from Study 1 and nine participants from Study 2 had incomplete or missing data on this task. Given $\alpha = .05$, a repeated measures ANCOVA procedure applied to this sample can detect small effect sizes in the range of $d = 0.1$ with a power of $1 - \beta = 0.90$ (Faul et al., 2007).

Manipulation

Subliminal (counter-)stereotype exposure. In both studies, we exposed participants to either subliminal stereotypes or subliminal counter-stereotypes. The advantage of using a subliminal priming procedure here is that it ensures that none of the participants were aware of stereotype exposure (confirmed by manipulation checks). When studying "subtle" stereotypes, this is somewhat subjective: Stereotype exposure that is subtle to one participant might seem obvious to another (e.g., a strong feminist identifier). Using a subliminal priming procedure avoids this issue.

The manipulation subliminally exposed participants to (counter-)stereotypical gender role divisions by combining subliminal gender primes with target pictures of stereotypically masculine and feminine activities, such as shopping or watching sports on television. Neither the prime nor the target picture was (counter-)stereotypical in isolation. Instead, (counter-)stereotypes were conveyed by the combination of certain primes with certain targets, such as "woman" paired with "cooking" or "cleaning." The target pictures did not show actors of either gender. The pictures were pilot tested, and 20 pictures (five female-typical leisure activities, five female-typical chores, five male-typical leisure activities, and five male-typical chores) were chosen that were considered stereotypically masculine or feminine, but similar in valence. In the stereotype condition, the prime "woman" was paired with female stereotypical pictures and the prime "man" with male stereotypical pictures in 95% of trials. In the counter-stereotype condition, female primes were paired with male stereotypical pictures and male primes with female stereotypical pictures in 95% of trials.

The manipulation consisted of 120 trials. The gender prime was presented for 42 ms, with supraliminal forward and backward masks (a random-letter string for 100 ms). Then the target picture appeared, and participants answered a question about the target picture ("Is this a leisure activity or a chore?") that was unrelated to gender stereotypes. To control for the effort of response switching (Rogers & Monsell, 1995), the number of response switches was kept constant between participants.

Measures

Women's and feminist identification. Women's identification ($M = 5.40$, $SD = 0.93$) and feminist identification ($M = 3.22$, $SD = 1.32$) were measured with the same four items, adapted from Doosje, Ellemers, and Spears (1995), such as "Being a woman [feminist] is an important part of how I see myself." Agreement with these items was rated on a 7-point Likert-type scale. These scales showed high reliability (women's identification $\alpha = .85$; feminist identification $\alpha = .94$) and a relatively small intercorrelation ($r = .30$). This

is in line with previous research showing that identification with women and feminists reflects separable dimensions of gender identity (Leicht, Gocłowska, van Breen, de Lemus & Randsley de Moura, 2017; Roy, Weibust, & Miller, 2007; van Breen et al., 2017). The identification variables are included as independent variables in the analyses presented below.

Counter-stereotypical performance and persistence. A math task was used to assess performance and persistence in a domain that counts as counter-stereotypical for women. The task consisted of 10 items. The difficulty of the items increased throughout the task, and the final item (unbeknownst to participants) was unsolvable. If the participant could not solve the item, they could press "skip this item." This measure yielded (a) a *performance* measure: the number of items answered correctly, and (b) a *persistence* measure: time spent attempting to solve the unsolvable item. Increased performance and/or persistence after subliminal exposure to stereotypes is indicative of resistance, as it establishes counter-stereotypical ability in the face of stereotypes.

Stereotypical performance and persistence. Study 2 also included an anagram task, which assessed performance and persistence in the domain of language and verbal skills, a domain that is more stereotypical for women (Brandell & Staberg, 2008; Deaux, 1985). The anagram task consisted of 10 questions, in order of increasing difficulty, with the last item being unsolvable. If the participant could not solve the item, then they could press "skip this item." This measure yielded (a) a performance measure: number of items answered correctly, and (b) a persistence measure: time spent on the unsolvable item.

The order of presentation of the math and the anagram tasks was counterbalanced.

In-group bias task. The third dependent variable was the MCD task (Bauman, McGraw, Bartels, & Warren, 2014; Thomson, 1986). This task examined women's evaluations of men and women after subliminal exposure to stereotypes versus counter-stereotypes. Previous research has established that responses in the MCD task can provide information about the social value given to different groups: Socially valued individuals are less likely to be sacrificed (Cikara, Farnsworth, Harris, & Fiske, 2010; De Dreu, Greer, Van Kleef, Shalvi, & Handgraaf, 2011).

The task consists of eight short scenarios in which sacrificing one person can save a number of others. In each scenario, the gender of the protagonist is manipulated: In four scenarios, participants are asked to sacrifice a man to save several others (of unspecified gender), and in four other scenarios they are asked to sacrifice a woman. The scenarios in which men and women appeared were counterbalanced across participants. In each scenario, participants indicate whether they would sacrifice the protagonist by answering the Yes/No question, "Would you sacrifice this man [woman] to save the others?" Willingness to sacrifice was computed by summing the number of scenarios in which participants sacrificed the target individual. As such, the willingness to sacrifice in the MCD task can show evidence for in-group favoritism and/or out-group derogation. For instance, increased tendencies to sacrifice out-group members (men) would be indicative of out-group derogation (Brewer, 1999).

We believe that the use of the MCD task as a measure of in-group bias has several benefits. First, the MCD task is an indirect measure, in which participants are not made aware of the role played by gender. In the context of the current study, we consider this to be an important benefit, as it ensures that the gender component is not referred to explicitly until the very end of the procedure and any effects of the subliminal manipulation are not altered by explicit reference to gender. Second, avoiding explicit reference to gender means that participants' responses are less likely to be affected by conscious correction of gender bias.

Third, the MCD task does not discourage out-group derogation. People are generally reluctant to derogate others because it is difficult to justify (Mummendey et al., 1992). The MCD task assuages this concern by the fact that sacrificing saves a greater number of others. Thus, although this task is extreme, sacrificing is morally justifiable in utilitarian terms.

Additional measures. These studies included several other outcome measures, which were designed to assess individual (rather than group) orientation following subliminal exposure to (counter-)stereotypes. We considered that, rather than "defending" the in-group, low-group identifiers might prefer to assert individual values following subliminal exposure to stereotypes, but there was no evidence for this. Details can be found in the supplementary materials.

Procedure. Upon arriving at the lab, participants were seated in individual cubicles. They read general information about the study and the tasks they would complete and provided informed consent. They then provided demographic information (including gender), after which they saw either the subliminal stereotype or counter-stereotype manipulation. After the implicit component of the study, participants completed the MCD task, followed by the math task and, in Study 2, the anagram task. Toward the end of the study, participants indicated their identification with women and feminists. Finally, participants completed a funneled debriefing.

Analytical procedure. The math task and the MCD task were analyzed using IDA (see Curran & Hussong, 2009) in which samples from the two studies are taken together. This strategy was chosen, first, because increased sample size provides better power to detect small effects. Second (and relatedly), IDA provides a better understanding of the underlying patterns as it minimizes the influence of any idiosyncrasies in the individual studies. To control for differences
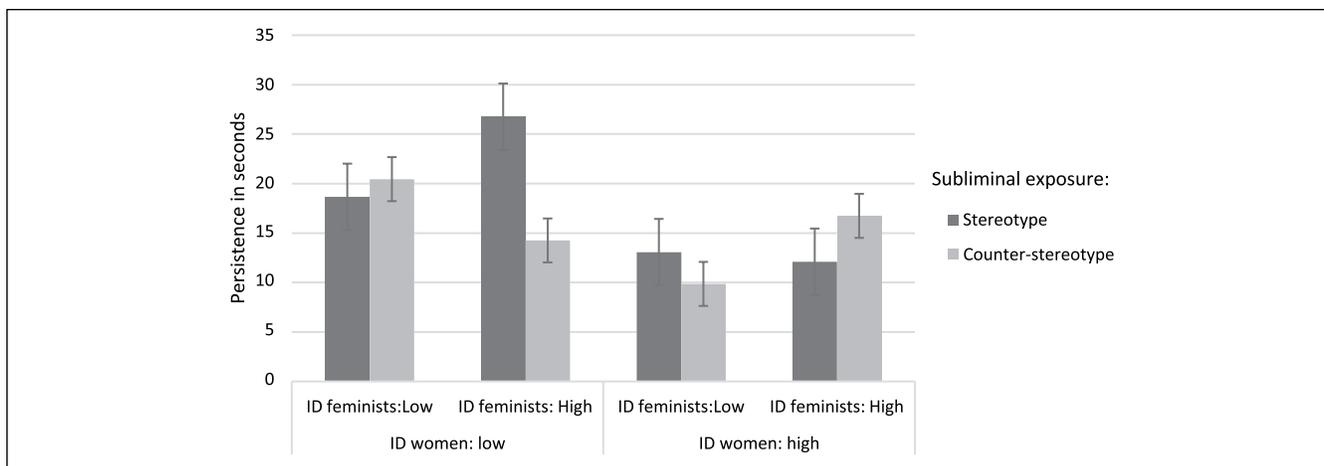
Figure 1. Persistence in the math task.
Note. Error bars represent 1 standard error. The identity variables (identification with women and identification with feminists) are plotted at ±1 standard deviation from the mean. ID = identification.

between the samples included in the IDA, we include the factor Study (1 vs. 2) in the analyses described below.

Statistical analysis for the math and anagram tasks used ANCOVA procedures. The outcome measures are number of items answered correctly (performance) and amount of time spent of the unsolvable item (persistence). These are predicted by subliminal (counter-)stereotype exposure, identification with women, and identification with feminists. For the MCD task, data were analyzed with repeated measures ANCOVA. The number of times that the protagonist is sacrificed is the outcome measure, predicted by the gender of the protagonist as a within-participants variable and subliminal (counter-)stereotype exposure, identification with women, and identification with feminists as the between-subjects variables. We also considered a multilevel model, in which the "sacrificed" versus "not-sacrificed" is a binary outcome, as an alternative to the repeated measures ANOVA. This model yielded very similar results and is described in the supplementary materials.

Omnibus interactions can be broken down into several different simple effects. In these studies, the simple effect of central interest is the manipulated factor of subliminal (counter-)stereotype exposure.

As women's identification and feminist identification were measured at the end of the study, we examined whether women's identification and feminist identification were statistically affected by (counter-)stereotype exposure. This was not the case for either identification with feminists, $F < 1.06$, $p > .305$, or identification with women, $F < 1.91$, $p > .167$.

Results

Performance and persistence. We expected that, after subliminal exposure to stereotypes, those who are strongly identified with feminists, but not the broader group of women, perform

better and persist longer in a counter-stereotypical domain. This should result in a three-way interaction between feminist identification, women's identification, and exposure condition. The math task included nine solvable items, of which participants correctly completed 5.90 on average ($SD = 1.80$). For the unsolvable item, participants persisted for an average of 18.26 s ($SD = 22.78$).

Performance on the math task was not significantly affected by exposure condition, women's identification, or feminist identification, $F < 1$. That is, there was no evidence that subliminal stereotype exposure triggers resistance in the form of improved performance.

However, *persistence* on the unsolvable item produced a three-way interaction between exposure condition, feminist identification, and women's identification, $F(1, 358) = 5.47$, $p = .020$, as shown in Figure 1. Simple slopes analysis showed that persistence is more strongly affected by subliminal exposure as identification with feminists goes up and identification with women goes down. Among women who are strongly identified with feminists but not the broader group of women, then, there is a significant effect of subliminal exposure: Subliminal exposure to stereotypes elicits greater persistence than subliminal exposure to counter-stereotypes ($M_{diff} = 12.4$ s), $F(1, 358) = 4.47$, $p = .035$, $d = 0.23$ (see Table 1). An alternative breakdown of the interaction showed that, when feminist identifiers are exposed to subliminal stereotypes, their persistence depends on identification with women, $\beta = -7.80$, $F(1, 358) = 6.47$, $p = .011$, so that persistence is higher as identification with women goes *down*. There was no further interaction with the term Study, $F < 2.29$, $p > .122$, indicating that these effects were comparable across the two samples. In sum, the hypothesis that those who are strongly identified with feminists, but not the broader group of women, would persist in a counter-stereotypical domain after subliminal exposure to stereotypes

Table 1. Simple Effects for the Persistence Measure.

		Subliminal exposure					95% CI	
Women's ID	Feminist ID	Stereotype	Counter-stereotype	M_{diff}	SE	p value	Lower	Upper
Low	Low	18.61	20.39	−1.77	3.95	.654	−9.54	5.97
	High	**26.67**	**14.26**	**12.41**	**5.87**	**.035**	**0.87**	**23.95**
High	Low	13.09	9.91	3.18	5.20	.541	−7.04	13.40
	High	12.16	16.72	−4.56	4.23	.282	−12.89	3.76

Note. High and low women's identification and feminist identification are shown at 1 standard deviation above and below the mean. Simple effects shown in bold are discussed in the text. ID = identification; CI = confidence interval.

Table 2. Simple Effects in the MCD Task.

			Subliminal exposure					95% CI	
Women's ID	Feminist ID	Person to be sacrificed	Stereotype	Counter-stereotype	M_{diff}	SE	p value	Lower	Upper
Low	Low	Men	**1.77**	**2.24**	**−0.47**	**0.19**	**.012***	**−0.84**	**−0.11**
		Women	2.09	2.10	−0.01	0.19	.959	−0.38	0.36
	High	Men	**2.38**	**1.77**	**0.62**	**0.29**	**.034***	**0.54**	**1.18**
		Women	2.08	1.97	0.11	0.29	.700	−0.46	0.69
High	Low	Men	1.90	1.95	−0.05	0.24	.845	−0.52	0.43
		Women	1.85	2.03	−0.18	0.24	.464	−0.66	0.30
	High	Men	2.03	2.39	−0.35	0.20	.075	−0.74	0.04
		Women	2.19	2.14	0.05	0.20	.798	−0.34	0.45

Note. High and low women's identification and feminist identification are shown at 1 standard deviation above and below the mean. Effects shown in bold are discussed in the text. MCD = Moral Choice Dilemma; ID = identification; CI = confidence interval.

(Hypothesis 1b) was confirmed, but the hypothesis regarding improved performance (Hypothesis 1a) was not.

We compared behavior on the math task with behavior in a more stereotypical domain, the anagram task, to assess whether subliminal exposure to stereotypes motivates performance and persistence generally or only in *counter*-stereotypical domains. Of the nine solvable anagrams, participants correctly completed 6.07 on average (SD = 2.15). For the unsolvable item, participants persisted for an average of 51 s (SD = 36.28). Neither performance nor persistence on the anagram task was affected by exposure condition, women's identification, or feminist identification, $Fs < 1.69$, $p > .196$. Although the sample size of the anagram task was small, we do believe these findings are relevant in that they suggest a "double dissociation," whereby the persistence effect occurs in the counter-stereotypical domain, but not in the more stereotypical domain. This finding supports our reasoning that the persistence we see on the math task is the product of a motivational process aimed at counteracting stereotypes.

In-group bias. We expected that the tendency to sacrifice women and men in the MCD task would be affected by subliminal (counter-)stereotype exposure, identification with feminists, identification with women, and the gender of the protagonist. Indeed, this interaction was significant, $F(1, 361) = 8.03$, $p = .005$.

Breakdown of the interaction showed that the interaction between feminist identification, women's identification, and subliminal (counter-)stereotype exposure affected the sacrificing of men, $F(1, 361) = 9.72$, $p = .002$, but not women, $F < 1$. Further breakdown showed that, overall, participants were reluctant to sacrifice men after subliminal stereotype exposure (compared with subliminal counter-stereotype exposure). This effect reached significance among those who are not strongly identified with either women or feminists, $F(1, 361) = 6.44$, $p = .012$, $d = 0.27$, and was marginally significant among those who are strongly identified with both identification dimensions, $F(1, 361) = 3.18$, $p = .075$. However, those who are strongly identified with feminists, but *not* with women, showed the *opposite* response: They sacrificed men *more* readily after subliminal stereotype exposure compared with counter-stereotype exposure, $F(1, 361) = 4.55$, $p = .034$, $d = 0.22$, as shown in Table 2 and represented graphically in Figure 2. There was no further interaction with the term Study, $F < 1$, indicating that the effects described above were similar in both studies.

In sum, our central hypothesis regarding sacrificing of men (Hypothesis 2b) was supported: Those who are strongly
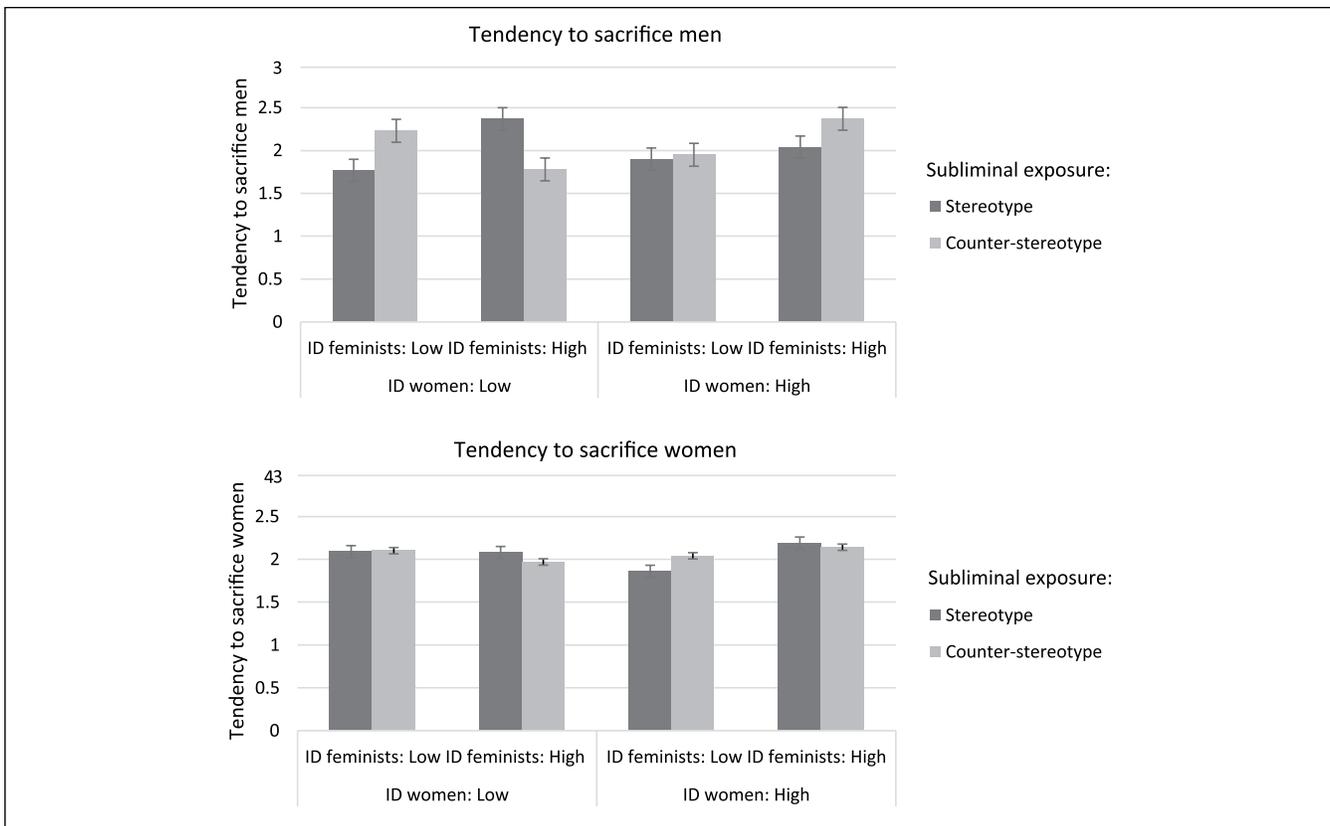
Figure 2. Participants' tendency to sacrifice men (top panel) and women (bottom panel) in the MCD task.
Note. Error bars represent 1 standard error. The identity variables (identification with women and identification with feminists) are plotted at ±1 standard deviation from the mean. MCD = Moral Choice Dilemma; ID = identification.

identified with feminists, but not women, sacrificed men more readily after subliminal stereotype exposure, than after subliminal counter-stereotype exposure. The hypothesis regarding the sacrificing of women (Hypothesis 2a) was not supported.

Discussion

These studies provide the first evidence that resistance to gender identity threat is possible even when the threat occurs outside of conscious awareness. Specifically, we show that among women who are relatively strongly identified with feminists, but not with the broader group of women, subliminal exposure to gender stereotypes elicits (a) persistence in a counter-stereotypical domain and (b) out-group derogation. We argue that both these responses reflect resistance because they do not assimilate to but instead go against subliminal stereotypes, attempting to counteract them. More specifically, persistence in counter-stereotypical (but not stereotypical) performance domains can counteract stereotypes by demonstrating counter-stereotypical competence. In the MCD task, out-group derogation can counteract the stereotypical implication that men are more socially valued than women (Ridgeway, 2001). In

sum, these responses are indicative of motivated resistance to subliminal gender stereotyping.

With regard to the math task, it is worth noting that there was no evidence for resistance on the performance measure, that is, exposure to subliminal stereotypes did not lead to improved performance. This may be due to reality constraints: Motivation alone is not sufficient for increased performance. At the same time, we might note that the performance measure showed no evidence of stereotype threat either. Reasons for this might include the fact that the math task was not difficult enough, as stereotype threat effects arise mainly on difficult tasks (O'Brien & Crandall, 2003). That is, it is possible that we would have seen stereotype threat effects on performance if the task had been more difficult. More broadly, with regard to the relationship between resistance and stereotype threat, it is important to note that resistance occurred among women who report relatively low identification with women (and high identification with feminists), a group that has been shown to be *less* sensitive to stereotype threat (Kaiser & Hagiwara, 2011). As such, the resistance findings of this study do not necessarily preclude the possibility of stereotype threat effects, but rather suggest that women's responses to subliminal stereotypes depend on gender identification.

In-group bias on the MCD task took the form of out-group derogation (increased tendencies to sacrifice men), but there was no evidence for in-group favoritism. This is noteworthy because, in general, research tends to find that in-group favoritism is more common and perceived as more acceptable than out-group derogation (Mullen et al., 1992; Mummendey et al., 1992). Specific features of the MCD paradigm might play a role in this finding. Although expressing devaluation through sacrificing is relatively simple and congruent with the task, in-group favoritism would be expressed through "not-sacrificing," which involves negations that can pose a challenge to implicit cognition (Gilbert, 1991). However, the specific circumstances that lead to either in-group favoritism or out-group derogation require further research.

In addition to the math task and the MCD task, Study 2 also included an *implicit* measure of resistance, which has not been discussed so far. The reason we included this measure is that, even when stereotypes are outwardly rejected, at the implicit level there may nevertheless be evidence of internalization of, or assimilation to, those stereotypes (Castelli, Vanzetto, Sherman, & Arcuri, 2001; Derks, Inzlicht, & Kang, 2008). Therefore, in the next section we turn to the possibility of resistance at the implicit level.[1]

Studies 2 to 4: Implicit Forms of Resistance

Having demonstrated that resistance to subliminal stereotype exposure can occur through behavioral strategies, like persistence in counter-stereotypical domains and in-group bias, we wanted to replicate these findings on an additional outcome measure. To do this, we now turn to the possibility of *implicit resistance* to subliminal stereotype exposure. The reason for this focus on implicit resistance strategies is that, under some circumstances, implicit attitudes and responses can diverge substantially from their more explicit counterparts (Nosek, 2007). This would mean that even when stereotypes are outwardly resisted, at the implicit level they might still be internalized to some extent (Castelli et al., 2001; Derks et al., 2008). Although we do not mean to suggest that implicit responses are somehow more "real" than explicit ones, if resistance indeed reflects the tendency to reject and counteract subliminal cues of devaluation, then resistance (rather than assimilation) should be evident at the implicit level as well. We examine this in Studies 3 and 4, and add data from Study 2 that also included this measure. For the purpose of these studies, we define "implicit measures" as those measures that assess an automatic response that is not under conscious control.

Given that we have defined resistance as a motivated process, it is worth noting that its motivational basis does not preclude its occurrence at the implicit level: motivational processes can have substantial influence on implicit cognition (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001; Glaser & Kihlstrom, 2005). For instance, women who were exposed to stereotypical gender roles (e.g., women in the kitchen, men in the office) resisted these associations through implicit in-group favoritism (de Lemus et al., 2018) and by implicitly associating their in-group with *counter*-stereotypical attributes (de Lemus, Spears, Bukowski, Moya, & Lupiáñez, 2013). Similarly, women who observed sexist interactions between men and women showed activation of counter-stereotypical traits in an implicit association test (IAT; Ramos et al., 2015). Here, we examine whether such implicit resistance strategies can also be used in response to *subliminal* stereotype exposure. We focus on an implicit measure of in-group bias, which functions as an implicit counterpart to the measure of in-group bias included in Studies 1 and 2 (the MCD task).

As a secondary aim, we examine the role of threat experience in resistance. Our definition of resistance emphasizes that it is a response to threat arising from gender stereotype exposure. To test this notion, we include a measure of threat experience in Studies 2 and 3.

Hypotheses

We expect that among women who report strong identification with feminists, but relatively low identification with women, subliminal exposure to stereotypes will lead to (1) experiences of threat and (2) resistance, in the form of implicit in-group bias.

Method

Design. The studies described here expose female participants to subliminal (counter-)stereotypes. In addition to this manipulation, identification with feminists and identification with women are measured as independent variables. Outcome measures are an evaluative priming task, which assesses implicit in-group bias, and an approach-avoidance task, which assesses experiences of threat. The data are analyzed using IDA (Curran & Hussong, 2009) and repeated measures ANCOVA.

Sample and power. The data were collected at the University of Groningen. All participants in these studies were women. Study 2 (discussed above) includes 256 participants, although four participants had missing data on the identification variables and could not be included in the analyses presented below. Study 3 includes 105 participants, and Study 4 includes 44 participants.[2] Based on Studies 1 and 2, we expected small effect sizes ($d \approx 0.10$).

The implicit in-group bias measure was included in Studies 2, 3, and 4; the pooled sample for this measure included 392 participants ($N2 = 248$, $N3 = 103$, $N4 = 41$). Four participants from Study 2, two participants from Study 3, and three participants from Study 4 had missing or incomplete data on this task. Given $\alpha = .05$, a repeated measures ANCOVA applied to this sample can detect small effect sizes in the range of $d = 0.10$ with a power of $1 - \beta = 0.85$ (Faul et al., 2007).

The threat experience measure was included in Studies 2 and 3; the final sample for this measure included 351 participants ($N2 = 248$, $N3 = 102$). Four participants from Study 2 and three participant from Study 3 had missing data on this task. Given $\alpha = .05$, a repeated measures ANCOVA applied to this sample is able to detect effect sizes of $d = 0.10$ with a power of $1 - \beta = 0.81$ (Faul et al., 2007).

Manipulation

Subliminal (counter-)stereotype exposure. The manipulation of subliminal (counter-)stereotype exposure was the same as in Studies 1 and 2.

Measures

Women's and feminist identification. The measures of identification with women ($\alpha = .86$) and identification with feminists ($\alpha = .93$) were the same as in Studies 1 and 2. The two identification variables showed only a low intercorrelation ($r = .17$), confirming that they measure distinct aspects of gender identity.

Implicit in-group bias. We included an evaluative priming task (Fazio, Jackson, Dunton, & Williams, 1995) to examine implicit in-group bias. The task consisted of 120 trials. Each trial presented a subliminal gender prime (a male or female name presented for 42 ms) with forward and backward masks (100 ms), followed by a supraliminal target.

Targets were positive ($N = 20$) or negative ($N = 20$) words without stereotypical connotations, such as "corpse" or "vacation" (adapted from Roefs et al., 2005). Participants were asked to classify targets as positive or negative, and analyses focused on the speed with which this decision was made. In this task, the facilitation of female-positive pairs, relative to male-positive pairs, following subliminal stereotype exposure would be indicative of resistance through in-group favoritism, as it reaffirms group value in the face of subliminal stereotypes. Similarly, facilitation of male-negative pairs (relative to female-negative pairs) would be indicative of resistance through out-group derogation, counteracting the implied social value of men in stereotypical representations.

Threat experience. Threat experience was assessed using an approach-avoidance task (De Houwer, Crombez, Baeyens, & Hermans, 2001). Participants direct a little stickperson to approach or avoid neutral (e.g., pocket, candle) and threatening word stimuli (e.g., problem, conflict), and analyses focused on the speed with which this was done. The task consisted of 120 trials: 30 threat-approach trials, 30 threat-avoidance trials, 30 neutral-approach trials, and 30 neutral-avoidance trials. The target words were selected to be unrelated to gender stereotypes. A threat response would be evident from faster avoidance of threatening stimuli.

Additional measures. We included several additional measures (mood, self-esteem, collective action tendencies) for comparison with previous studies, which suggest that subliminal stereotype exposure does not produce resistance on explicit measures (Barreto et al., 2010; Kray et al., 2001). We also included an implicit measure of stereotyping to examine whether lead women might resist subliminal stereotypes by showing activation of *counter*-stereotypical associations (de Lemus et al., 2013; Ramos et al., 2015). Due to space constraints, details and results of these measures are given in the supplementary materials.

Procedure. Upon arrival to the lab, participants read an information brochure and provided informed consent. After answering demographic questions, participants were randomly assigned to one of the two subliminal exposure conditions. Participants completed the implicit outcome measures first, followed by the explicit measures. Measures that directly referred to identity (identification with women and feminists) were completed last.

At the end of the study, participants completed a funneled debriefing. None of the participants guessed the hypotheses.

Analytical procedure. The reaction time (RT) data on which the implicit measures rely were filtered according to a predetermined cutoff. Responses below 300 ms and above 1,500 ms were excluded (Ratcliff, 1993). Subsequently, responses that fell more than 3 standard deviations above the mean were also excluded. Data were analyzed using repeated measures ANCOVA. We also considered multilevel models for both measures, in which the level of analysis is different trials, nested in participants. These models yielded very similar results to the results of the repeated measures ANCOVA (see supplementary materials).

Regarding the decomposition of omnibus interactions, the evaluative priming task, used to measure implicit in-group bias, is designed to assess how the presentation of subliminal primes affects classification speed for different target words. That is, on this measure, the simple effect of central interest is the effect of the subliminal gender prime (female vs. male name). The threat experience measure did not involve subliminal primes.

Therefore, we use the same procedure as in Studies 1 to 2, whereby the simple effect of central interest is the effect of subliminal (counter-)stereotype exposure.

Preliminary analyses. Identification with feminists and women were measured after the manipulation. Therefore, we examined whether they were affected by the manipulation, but this was not the case (Fs < 2.97, ps $> .085$), confirming that they can be used as independent variables in the analysis presented below.

Results

Implicit in-group bias. We expect that subliminal exposure to stereotypes will trigger resistance in the form of
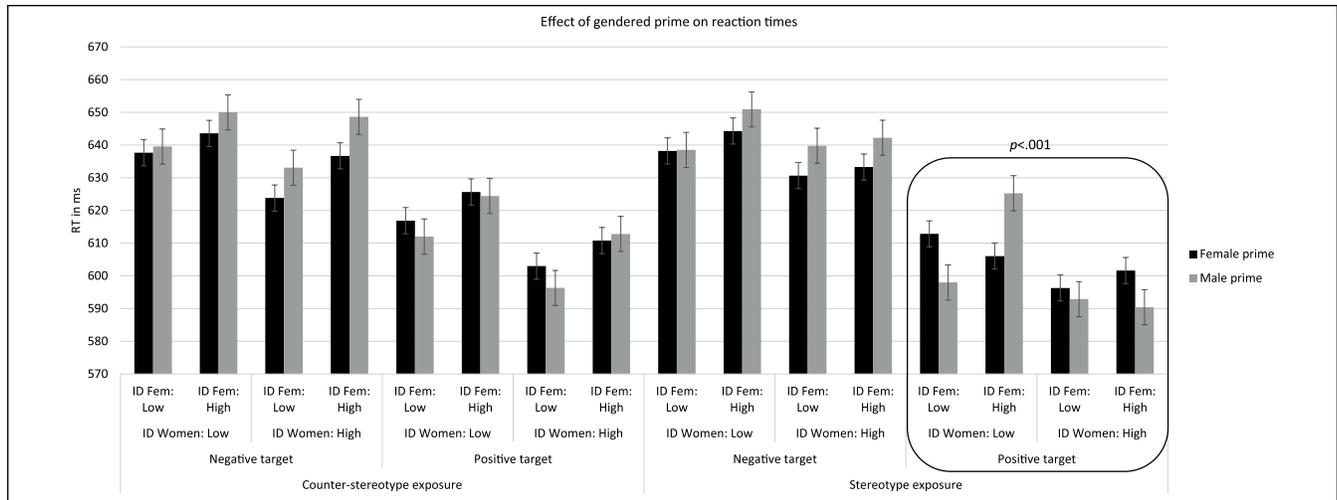
Figure 3. The results of the implicit in-group bias measure.
Note. Faster responses indicate greater accessibility of the association. Error bars represent 1 standard error. The identity variables are plotted at ±1 standard deviation from the mean. The circled section represents the interaction discussed in the text. ID = identification.

implicit in-group bias, among those women who are strongly identified with feminists, but not women. This should result in an interaction between (counter-)stereotype exposure, feminist identification, women's identification, gender of the prime (female/male), and target valence (positive/negative). Indeed, this interaction reached significance, $F(1, 392) = 5.01$, $p = .026$.

Breakdown of the interaction showed that RTs to positive targets were affected by the interaction between subliminal (counter-)stereotype exposure, identification with women, identification with feminists, and the gender of the prime, $F(1, 392) = 12.39$, $p < .001$, but RTs to negative targets were not, $F < 1.24$, $p > .267$. Further breakdown showed that after subliminal exposure to stereotypes, responses to positive targets were affected by identification with women, identification with feminists, and the gender of the prime, $F(1, 392) = 18.11$, $p < .001$. This interaction was not present in the counter-stereotype condition, $F < 1$. In other words, only after subliminal exposure to stereotypes did the gender of the prime affect RTs to positive targets (see Figure 3).

What form this effect takes further depends on identification with women and feminists. Among those who are low identifiers on both dimensions, positive targets are recognized more easily when they are preceded by male (rather than female) primes ($M_{diff} = -15$ ms), $F(1, 392) = 8.58$, $p = .004$, $d = 0.30$. This trend was also evident among those women who were strongly identified on both dimensions ($M_{diff} = -11$ ms), $F(1, 392) = 3.19$, $p = .075$. This pattern reflects a form of out-group favoritism. Crucially though, those women who are strongly identified with feminists, but not women, reverse this pattern. After subliminal exposure to stereotypes, the categorization of positive words was facilitated by female (rather than male) primes ($M_{diff} = 19$ ms), $F(1, 392) = 11.87$, $p = .001$, $d = 0.35$. This pattern reflects

in-group favoritism, as positive words are more accessible when they are associated with the in-group rather than the out-group. For an overview of simple effects, see Table 3. There was no further interaction with the term Study, $F < 1.83$, $p > .162$, indicating that these findings are comparable across the different samples.

Taken together, results show that women who are strongly identified with feminists, but not women, resist subliminal stereotype exposure through implicit in-group favoritism.

Threat experience. The approach-avoidance task, which measures threat experience, showed an interaction between (counter-)stereotype exposure, feminist identification, direction of response (approach/avoid), and target type (threatening/neutral), $F(1, 350) = 4.82$, $p = .029$. Decomposition of the interaction showed that responses to threatening targets were affected by an interaction between (counter-)stereotype exposure, feminist identification, and direction of response, $F(1, 350) = 5.88$, $p = .016$. There was no such interaction in response to neutral targets, $F < 1$. Further breakdown showed that high feminist identifiers avoid threatening targets more quickly after subliminal exposure to stereotypes, compared with counter-stereotypes ($M_{diff} = 36$ ms), $F(1, 350) = 4.30$, $p = .039$, $d = 0.26$. There was no such effect among low feminist identifiers, $F < 1.21$, $p > .273$. These findings are represented in Figure 4. There was no further interaction with the term Study, $F < 1.66$, $p > .198$, indicating that this effect was comparable across the two samples.

These results indicate that feminist identifiers experience threat after subliminal exposure to stereotypes. However, our hypothesis was that this would be particularly true for feminists who are *not* strongly identified with women. But this was not the case ($F < 1$). As such, these findings provide partial support for our reasoning regarding the role of threat in resistance.

Table 3. Simple Effects of the Gender of the Prime in the In-Group Bias Measure.

			Female prime	Male prime	M_{diff}	F value	p value	95% CI Lower bound	Upper bound	Effect size η_p^2
Counter-stereotype exposure	Negative target	ID Fem: Low	637.66	639.58	1.92	0.27	.604	−5.36	9.20	.001
		ID Fem: High	643.59	650.01	6.42	1.95	.164	−2.63	15.48	.005
		ID Women: Low	623.83	633.11	9.27	2.33	.128	−2.67	21.22	.006
		ID Women: High	636.70	648.63	11.93*	5.35	.021	1.78	22.08	.014
	Positive target	ID Fem: Low	616.91	612.03	−4.88	1.36	.244	−13.10	3.34	.004
		ID Fem: High	625.67	624.45	−1.22	0.06	.814	−11.45	9.00	.000
		ID Women: Low	603.01	596.34	−6.67	0.95	.332	−20.16	6.82	.002
		ID Women: High	610.82	612.82	2.01	0.12	.730	−9.45	13.47	.000
Stereotype exposure	Negative target	ID Women: Low	638.23	638.53	0.30	0.00	.947	−8.53	9.14	.000
		ID Women: High	644.30	652.93	8.64	3.06	.081	−1.07	15.34	.006
		ID Women: Low	630.67	639.80	9.13	2.40	.122	−2.46	20.71	.006
		ID Women: High	633.29	642.23	8.95	2.59	.109	−1.28	23.58	.007
	Positive target	**ID Fem: Low**	**612.87**	**598.01**	**−14.86***	**8.58**	**.004**	**−24.84**	**−4.89**	**.022**
		ID Fem: High	**606.06**	**625.27**	**19.20***	**11.87**	**.001**	**8.25**	**30.16**	**.030**
		ID Women: Low	596.31	592.89	−3.42	0.26	.608	−16.49	9.66	.001
		ID Fem: High	**601.66**	**590.44**	**−11.22**	**3.19**	**.075**	**−19.89**	**−1.99**	**.008**

Note. The identity variables are shown at ±1 standard deviation from the mean. The simple effects shown in bold are discussed in the text, and significant effects are indicated by an asterisk. Aside from the simple effects described in the main text (in bold), the table also shows some significant differences on negative targets (in both conditions): Women who are strongly identified with women overall respond quicker to female-negative pairs than to male-negative pairs. However, the higher order interactions with condition are not significant ($F < 1$), showing that this is a general trend rather than an effect of exposure condition. CI = confidence interval; ID = identification.
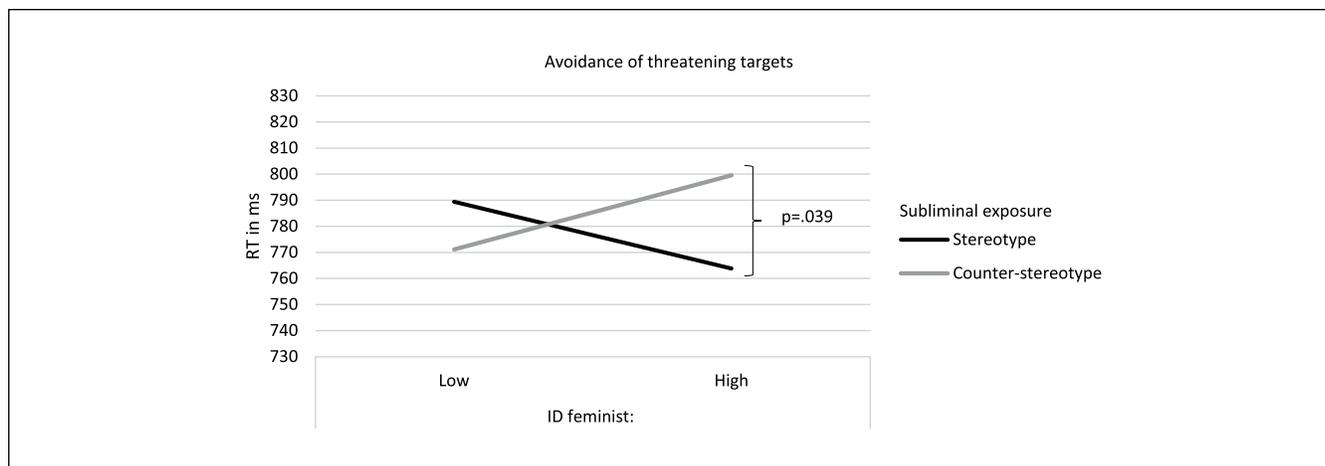
Figure 4. Results of the Threat Experience Task.
Note. Lower RTs indicate faster avoidance of threatening targets. Low and high identification with feminists is plotted at ±1 standard deviation from the mean. RT = reaction time.

Discussion

Results from these studies confirm our hypothesis that women who are strongly identified with feminists, but not with women as a group, resist subliminal stereotypes through implicit in-group bias. These studies, then, are the first to show implicit resistance to subliminal identity threat. The contribution of this finding lies, first, in the fact that it replicates the results from Studies 1 to 2 and provides further evidence for resistance to subliminal stereotypes. Second, these studies are among the first to show that identity management can occur through *implicit* strategies (see also de Lemus et al., 2013; Ramos et al., 2015), underscoring that resistance can occur without conscious intervention. Just as a healthy physical immune system might resist a pathogen automatically, people may develop subtle psychological resistance mechanisms that function outside of conscious awareness. In addition, this finding assuages concerns arising from previous research (Castelli et al., 2001; Derks et al., 2008), that the resistance responses observed in Studies 1 to 2 represent a purely "outward" response.

Finally, findings from these studies confirm that subliminal stereotype exposure is threatening to women who identify with feminists and suggest that this experience of threat subsequently triggers resistance. However, this finding does beg the question of why resistance does not occur among women who are strongly identified with feminists *and* with women, who experience threat after subliminal stereotype exposure, but do not resist. We return to this interesting issue in the General Discussion.

General Discussion

These studies provide the first evidence that resistance to gender identity threat is possible even when the threat occurs outside of conscious awareness. Specifically, we demonstrate that resistance can occur not only through behavioral strategies, such as persistence in counter-stereotypical performance domains and behavioral in-group bias, but also through implicit strategies, such as implicit in-group bias. More broadly, the studies presented here add to the literature on breaking down stereotypes (e.g., Kawakami et al., 2000), by showing motivated resistance on the part of the *targets* of stereotypes.

When we consider the reasons why the current research found evidence for resistance to subliminal stereotypes while previous studies demonstrate assimilation, there are several issues worth noting. First, compared with previous studies, our definition of resistance includes not just direct resistance strategies such as collective action, but any response that is aimed at countering or disproving gender stereotypes. Second, resistance was not evident among all of our participants: Only a certain subgroup of women, those who are strongly identified with feminists, but not the broader group of women, showed evidence for resistance. This raises the question of *why* this is the case, which brings us to a further contributing factor: the role of threat. As noted in the Introduction, previous research has suggested that women who are strongly identified with feminists, but not women, are most likely to object to gender stereotypes (van Breen et al., 2017). Such general concern with gender inequality is known to increase sensitivity to subliminal instances thereof (Kaiser et al., 2006). This suggests that these women may develop hypervigilance for gender-based threat and more sophisticated and diverse strategies to counter it (Miller & Kaiser, 2001). Analogous to a healthy diet boosting the physical immune system, those who are attuned to potential identity threat may have a more developed automatic defense system than others. In sum, the measures we used, as well as the fact that we considered the roles of identification and threat, go some way to explaining why we found resistance where previous studies did not.

Given this reasoning, the responses of those who are highly identified with both feminists *and* women seem somewhat surprising. These women experienced threat following subliminal stereotype exposure, but showed no evidence of resistance. One reason for this may be that women who are strongly identified with women as a group might feel rather ambivalent about gender stereotypes because (aside from their threatening consequences) gender stereotypes can also have *positive* aspects. For instance, stereotypes can provide differentiation from out-groups—in this case, men—leading ostensibly "low status" stereotypes to be (re)evaluated more positively (Mlicki & Ellemers, 1996). Similarly, *self*-stereotyping can be a way of demonstrating group commitment (Spears, Doosje, & Ellemers, 1997). Such concerns, associated with strong identification with women as a group, might undermine tendencies to reject and resist stereotypes. Alternatively, those who are strongly identified on both dimensions might simply prefer different resistance strategies, ones that were not included in these studies (see Leicht et al., 2017, for first indications in this direction). This latter possibility represents an important area of future research.

Although gender identification played an important role in the studies presented here, there is evidence that the underlying principles of resistance as a way of counteracting subliminal social identity threat also apply in other contexts. Recent research from our lab (van Breen, de Lemus, Spears, & Kuppens, 2018) shows evidence for resistance to subliminal stereotypes in the context of national identity in Spain. Spanish participants who were exposed to subliminal in-group stereotypes that legitimized the economic crisis responded with implicit in-group bias. That is, although the occurrence of resistance was specific to a particular group of women in the current studies, we believe that the principle of resistance to subliminal stereotypes has validity across different group contexts.

One remaining question regarding the relationship between resistance and experiences of threat is whether resistance is functional in reducing threat. This notion is theoretically compatible with the idea of resistance. However, we do not believe that resistance should *necessarily* reduce threat directly. Instead, resistance may protect against "downstream" detrimental effects of group devaluation (for instance, on self-esteem or negative emotion; Barreto et al., 2010), without reducing the experience of threat itself. Similarly, the beneficial effects of resistance can lie in the feeling of "having done something," increasing feelings of empowerment and efficacy (see Cocking & Drury, 2004; Drury & Reicher, 2005) without necessarily making the threat itself less acute. Indeed, it may be important to remain vigilant to threat, that is, reductions in threat experience may not always be desirable. As the current study could not address this issue directly, we believe that examining the beneficial effects of resistance is an important avenue for future research.

Limitations

One limitation of this work is that we compare subliminal stereotype exposure and subliminal counter-stereotype exposure as the simple effect of central interest. This raises the question of which condition drives the effects observed. We believe that two sources of evidence suggest that it is subliminal *stereotype* exposure that drives these effects. First, omnibus interactions can be decomposed in several ways, meaning that we could create a breakdown which does not rely on direct comparisons between the exposure conditions. For instance, we might take identification with women as the simple slope of central interest. Applying this approach to the persistence measure shows that when feminist identifiers are exposed to subliminal stereotypes, their persistence depends on identification with women, so that feminists who are *not* strongly identified with women show increased persistence compared to those who identify strongly with women. Similarly, for the implicit in-group bias measure, the effect of interest (facilitation of female-positive pairs relative to male-positive pairs) occurs only after subliminal stereotype exposure. Aside from this data-driven evidence, we believe that, theoretically speaking, the results observed are not readily reinterpreted as the result of counter-stereotype exposure. For instance, we might consider the possibility that, rather than resistance to subliminal stereotypes, these findings reflect *endorsement of counter-stereotypes* among women who are strongly identified with feminists but not women. However, it is unclear why this should lead to *reductions* in persistence. In sum, we consider resistance to subliminal stereotypes to be the most fitting and parsimonious explanation for these findings.

Conclusion

These findings show that resistance to gender identity threat is possible even when the threat occurs outside of conscious awareness. More specifically, those women who are relatively strongly identified with feminists, but not the broader group of women, counteract subliminal exposure to stereotypes through (a) increased persistence in counter-stereotypical domains, (b) greater willingness to sacrifice men, and (c) implicit in-group bias. As such, the current article provides the first evidence that *resistance* to subliminal stereotyping is possible. Just as the physical immune system might resist a pathogen automatically, some group members may develop psychological resistance mechanisms that function outside of conscious awareness. These findings indicate that members of devalued groups need not be conscious of social identity threat to be able to resist it, suggesting that there is more scope to contest social devaluation than previously thought.

Author Contributions

Declaration of Conflicting Interests

Funding

Notes

1. For ease of presentation, we discuss the result of Study 2's implicit measure in the section below, which is dedicated specifically to the possibility of implicit resistance.
2. For the analysis of these implicit outcome measures, we had originally planned to use multilevel modeling (see supplementary materials). The greater flexibility of multilevel analysis (e.g., with regard to random effects), as well as the fact that there are many observations (trials) per participant, means that smaller samples can still yield acceptable power.

Supplemental Material

Supplementary material is available online with this article.

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