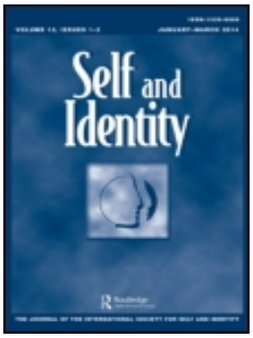

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Warming Up and Cooling Down: Self-Esteem and Behavioral Responses to Social Threat During Relationship Initiation

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Social threats during relationship initiation often cause people to engage in cold behaviors that bring about rejection. However, interpersonal risk-regulation theory suggests that such processes will be moderated by global self-esteem. In two experiments that manipulated the threat of rejection, single participants communicated via video camera with an opposite-sex interaction partner (actually a confederate). As expected, social threat caused higher self-esteem individuals (HSEs) to exhibit a warming-up behavioral response but caused lower self-esteem individuals (LSEs) to exhibit a cooling-down behavioral response, according to both observer-reports and self-reports, which in turn led observers to like HSEs more than LSEs. Furthermore, these effects were independent of similar, previously documented, interpersonal risk-regulation effects on participants' perceptions of acceptance from the confederate.

Keywords: Self-esteem; Risk-regulation; Self-fulfilling prophecy; Threat; Acceptance; Warmth.

> I nursed a bilious fear that I was unlovable. So I deployed the classic foot-shooting gambit for control: I failed on my own terms. I threw the game to avoid losing. I yearned to be liked, so I wore a look that told everybody I couldn't care less whether they liked me. I made a mask of my face and hid behind it.
>
> — *Make Peace,* by Katie Arnold-Ratliff (*O, The Oprah Magazine*, January, 2014, para. 5)

In the quote that opens this paper, Ms Arnold-Ratliff describes how she adopted a cold, disdainful facial expression as a means of avoiding the rejection she anticipated from her peers when she was growing up. Armed with her inexpressive mask, she felt control over her social outcomes and felt less vulnerable to the rejection and pain she anticipated. This type of pre-emptive, inhibitory *cooling-down response* is common when individuals perceive that their relational value is threatened and rejection may occur when meeting new people (e.g., Curtis & Miller, 1986; Stinson, Cameron, Wood, Gaucher, & Holmes, 2009). When people anticipate *social threats* such as rejection, hurt feelings (Lemay, Overall, & Clark, 2012), or social pain (e.g., MacDonald & Leary, 2005), they adopt an inhibited, inexpressive interpersonal style that allows them to remain aloof and unconnected to potentially painful social bonds.

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Unfortunately, cooling-down can create the very rejection that one is trying to avoid. In the *rejection prophecy*, one's social expectations come to create the rejection (or acceptance) that one anticipates (Stinson et al., 2009; Stinson, Logel, Shepherd, & Zanna, 2011). The behavioral key to the rejection prophecy is one's degree of warmth–coldness, which is a central dimension of social behavior (Wiggins, 1996). Warmth–coldness reflects communal, connection motivations, and a desire to become closer to one's interaction partner on one hand, and independent, distancing motivations, and a desire to withdraw from one's interaction partner on the other. Consequently, anticipating acceptance prompts warm and inviting behavior, whereas anticipating rejection prompts cold and distancing behavior. Because warmth is a socially desired trait in both men and women (e.g., Anthony, Holmes, & Wood, 2007; Fletcher, Simpson, Thomas, & Giles, 1999), and because warmth communicates liking of one's interaction partners (Stinson et al., 2009), warm and friendly behavior leads to acceptance by interaction partners, whereas cold and aloof behavior leads to less acceptance or even outright rejection. Thus, the rejection prophecy is fulfilled.

Because of the rejection prophecy, people's behavioral responses to social threats have important consequences for the quality of their social bonds. Therefore, understanding how aspects of the self and the situation interact to determine people's warm and cold interpersonal behaviors is an important goal for social psychologists. Pursuant to this goal, we examine how global self-esteem determines people's warm and cold behavioral responses to social threats during relationship initiation, which in turn determine people's actual experiences of acceptance or rejection.

Self-Esteem and Warming-Up or Cooling-Down Responses to Social Threat

According to the sociometer model, global self-esteem reflects one's chronic feelings of relational value (e.g., Leary & Baumeister, 2000). Individuals with higher self-esteem (HSEs) are confident that they are valuable relational partners and project that confidence onto their future relationships, whereas individuals with lower self-esteem (LSEs) doubt their relational value and maintain that social pessimism, even when meeting new people. Moreover, interpersonal risk-regulation theory (e.g., Murray & Holmes, 2011) suggests that people rely on their self-esteem not only to predict future social outcomes, but also to regulate their behavioral responses to real or anticipated social threats that occur within important and consequential social bonds (e.g., Cavallo, Fitzsimons, & Holmes, 2009; Lemay & Clark, 2009; Murray, Holmes, & Collins, 2006; Wood & Forest, 2011).

In social contexts as varied as parent–child relationships, friendships, romantic relationships, and meeting new groups of people, social threats prompt LSEs to adopt a motivational style that focuses on protecting themselves from rejection, whereas social threats prompt HSEs to adopt a motivational style that focuses on connecting with socially desirable interaction partners (e.g., Anthony, Wood, & Holmes, 2007; Cameron, Stinson, Gaetz, & Balchen, 2010; Cameron, Stinson, & Wood, 2013; Cavallo, Holmes, Fitzsimons, Murray, & Wood, 2012; DeHart, Murray, Pelham, & Rose, 2003; Jaremka, Bunyan, Collins, & Sherman, 2011; Marigold, Holmes, & Ross, 2010). However, across all of these diverse social contexts and on a wide range of psychological variables, social threat is necessary to reveal a positive association between self-esteem and connection motivations: When the specter of rejection is absent and social rewards are sufficiently high, LSEs are equally or even more motivated than HSEs to pursue connections with desirable interaction partners (e.g., Stinson, Cameron, & Robinson, in press).

Reflecting their self-protective, inhibited, and distancing response to social threats, we predict that LSEs will exhibit a cooling-down behavioral response to social threat during relationship initiation—evidenced by decreased warm behaviors and/or increased cold behaviors. In turn, due to the rejection prophecy, this cooling-down response will result in the very rejection that LSEs are trying to avoid. In contrast, reflecting their connecting, communal, and expressive response to social threats, we predict that HSEs will exhibit a *warming-up response* to social threat during relationship initiation—evidenced by increased warm behaviors and/or decreased cold behaviors—which in turn will cause others to be accepting. Thus, we suggest that HSEs actively rewrite the rejection prophecy when they respond to the acute social doubts that are prompted by social threats, a reactive strategy that will create the social acceptance that they typically expect. However, consistent with prior interpersonal risk-regulation research, we also predict that when social threat is absent, self-esteem differences in behavior and actual acceptance will also be absent.

Reconciling Our Hypotheses with Past Research

Prior research has demonstrated that ego threats cause HSEs to be liked *less* by interaction partners than LSEs (Heatherton & Vohs, 2000; Vohs & Heatherton, 2001, 2004). At first blush, our predictions seem to directly contradict these results. However, it is important to remember that not all self-threats target the same aspect of the self (Leary, Terry, Allen, & Tate, 2009), and different types of self-threats prompt different motivational responses as a function of self-esteem. Vohs' and Heatherton's (2001) research compellingly demonstrates that threats to positive self-image that arise from failure on an academic task cause LSEs to desire stronger *connections* with interaction partners (i.e., to become more interdependent), but cause HSEs to desire greater *distance* from interaction partners (i.e., to become more independent). In contrast, interpersonal risk-regulation research compellingly demonstrates that threats to belonging that arise from the possibility of rejection by an otherwise desirable social partner cause LSEs to desire greater *distance* from interaction partners, but cause HSEs to desire greater *connection* with interaction partners. Ultimately, regardless of the type of threat that one experiences, it is the strength of one's connection motivation that determines liking by interaction partners (presumably because connection motivations translate into warm interpersonal behaviors). Thus, Vohs and Heatherton demonstrated that LSEs are more liked than HSEs following an ego threat because LSEs experience stronger connection motivation than HSEs following ego threats. In contrast, we predict that HSEs will be more liked than LSEs following a social threat because a large body of research demonstrates that HSEs reliably experience stronger connection motivation than LSEs following social threats.

Building on Past Research

The large body of interpersonal risk-regulation research certainly suggests that self-esteem differences in connection and protection motivations as a function of social threats will be evident in objectively observable warm and cold behaviors. Yet surprisingly, this possibility has rarely been tested in interpersonal risk-regulation research, due in large part to the rarity of behavioral dependent measures in psychological research (e.g., Baumeister, Vohs, & Funder, 2007).

There are a few studies that hint that our behavioral mechanism hypotheses are correct, yet each includes limitations that necessitate the current research. One single experiment has demonstrated that social threats can prompt self-esteem differences in liking by

observers in a manner consistent with our hypotheses (Cameron et al., 2010; Study 5). However, that experiment was low in statistical power ($n = 36$; p. 524) and the authors did not assess participants' warm and cold behaviors. Another recent experiment demonstrated that social threat causes higher self-esteem men to use more direct relationship-initiation behaviors than lower self-esteem men (e.g., flirting, leaning toward partner; Cameron et al., 2013, Study 2). However, direct initiation behaviors may reflect the dominant–submissive dimension of interpersonal behavior (Wiggins, 1996) rather than the warmth–coldness dimension, and dominance–submissiveness does not predict liking by interaction partners (Stinson et al., 2009).

Moreover, Gaucher et al. (2012) demonstrated that LSEs are less likely to be expressive and disclose negative emotions to their friends and loved ones than HSEs, according to both self-reports and observer-reports, due to self-esteem differences in perceived regard from interactions partners. Baker and McNulty (2013) observed similar self-esteem differences in verbal expressivity and disclosure (as a function of relational self-construal, not perceived regard). However, these experiments did not examine the context of relationship initiation, nor did they examine non-verbal behavior or link self-esteem differences in behavioral responses to social threats to downstream acceptance or rejection by interaction partners. Thus, the current research has the potential to make an empirical contribution by conceptually replicating and extending prior research in several important ways.

Overview of Research Methods and Goals

We test our hypotheses in two experiments that manipulate social threats in a relationship-initiation context, which is a relatively understudied phase in the development of close relationships (e.g., Eastwick & Finkel, 2008). In both experiments, romantically single and heterosexual participants will interact via video-taped messages with an opposite-sex interaction partner (actually a confederate). Observers will then code participants' warm (e.g., smiling) and cold (e.g., avoiding eye contact) behaviors, and rate their liking for participants. Participants will also report the level of acceptance they perceive from the confederate, and in Study 2, they will self-rate the same warm and cold behaviors that are rated by observers.

In both experiments, we will test a number of confirmatory hypotheses (Hs; see Table 1). We predict that social threat will cause HSEs to be liked more than LSEs (H1). We also expect that social threat will cause a cooling down response (i.e., increased cold behaviors and/or decreased warm behaviors) for LSEs (H2) but a warming up response (i.e., decreased cold behaviors and/or increased warm behaviors) for HSEs (H3). In turn, we expect that LSEs' cooling down response and HSEs' warming-up response to social threat will explain why HSEs are liked more than LSEs following social threat (H4).

We will also investigate a number of exploratory hypotheses (EHs; see Table 1). First, although observers' holistic impressions of actors' warmth explain the rejection prophecy (Stinson et al., 2009), the specific warm or cold behaviors that determine such holistic impression are unknown. Furthermore, although warm and cold behaviors reflect opposing poles of the same interpersonal behavioral continuum (i.e., warmth–coldness), social threat may influence only one type of behavior as a function of self-esteem. For example, Ms Arnold-Ratliff's account that opened this paper suggests that cold behaviors are most likely to be affected by anticipated rejection, whereas warm behaviors may remain relatively unaffected by social threats. Indeed, it is possible to exhibit a mixture of warm and cold behaviors, as when socially anxious individuals exhibit "innocuous sociability" (Schlenker & Leary, 1982, p. 655) by smiling, nodding, and maintaining eye contact (i.e., warm behaviors)

TABLE 1 Summary of Hypotheses

Confirmatory hypotheses
H1. Social threat causes HSEs to be liked more than LSEs
H2. LSEs exhibit a cooling-down response to social threat
H3. HSEs exhibit a warming-up response to social threat
H4. Behavioral responses to threat explain why social threat causes HSEs to be liked more than LSEs
H5. Social threat causes HSEs to appear more motivated to initiate a new relationship than LSEs[a]
H6. Behavioral responses to threat explain why social threat causes HSEs to appear more motivated than LSEs[a]
Exploratory hypotheses
EH1. Does social threat prompt self-esteem differences in warm behavior?
EH2. Does social threat prompt self-esteem differences in cold behavior?
EH3. Are participants aware of their own warm and cold behaviors?
EH4. Are behavioral and perceptual responses to social threat independent?
EH5. Do participants appear to anticipate the social consequences of their behavior?[a]

[a] Hypotheses introduced in Study 2.

while also remaining inexpressive and non-disclosing (i.e., cold behaviors). Thus, in the present research, we examine whether social threat prompts changes in participants' use of specific warm behaviors (e.g., smiling, eye-contact; EH1), cold behaviors (e.g., closed posture, avoiding eye contact; EH2), or both, as a function of self-esteem.

Second, the extent to which people are aware of their own warm and cold behavioral responses to social threat has not been assessed in prior research examining the rejection prophecy. Thus, in Study 2 we will compare participants' behavioral self-reports to observer-reports across conditions and as a function of self-esteem. This method will allow us to determine whether people are self-aware of their warm and cold behaviors in general (i.e., do participant-reports correlate positively with observer-reports of the same behaviors?), and in response to social threat, in particular (i.e., do self-esteem and social threat interact to predict participant-reports in the same manner as observer-reports?; EH3).

Finally, we will explore whether the behavioral effects that we anticipate as a function of self-esteem and social threat are tied to similar perceptual effects that have been documented in the literature (Cameron et al., 2010; Stinson et al., in press). Social threat causes HSEs to perceive more acceptance from interaction partners, but causes LSEs to perceive less acceptance from interaction partners, even when HSEs and LSEs are exposed to identical acceptance cues from a confederate. These perceptual biases are thought to be a projection of participants' motivational responses to threat, such that HSEs' social-connection motivation prompts them to perceive more acceptance, but LSEs' social-distancing motivation prompts them to perceive less acceptance. Thus, it is possible that self-esteem differences in behavior as a function of social threat reflect the same underlying psychological process responsible for self-esteem differences in perceptions of acceptance cues. But, it is also possible that behavioral and perceptual responses to social threat are independent risk-regulation responses—guided by the same general risk-regulation motivation, but reflecting distinct psychological processes. To tease apart these possibilities, in both experiments we will examine whether self-esteem differences in behavior as a function of social threat are independent of similar, previously documented self-esteem differences in perceptions of acceptance as a function of social threat (EH4). These results will shed light on the psychological structure of risk-regulation responses to social threats.

Study 1

In our first experiment, we code the warm and cold behaviors, and observers indicate their liking of participants in a previously published experiment that manipulated the threat of rejection in a relationship-initiation context (Cameron et al., 2010, Study 2). The published results from this experiment demonstrated that social threat caused HSEs to perceive more acceptance but caused LSEs to perceive less acceptance from a potential romantic partner (actually a video-tape of a confederate). However, the participants' own behavior was not evaluated. Consistent with the hypotheses presented in Table 1, we predict that social threat will cause a cooling-down response for LSEs that will result in decreased liking by observers, whereas social threat will cause a warming-up response for HSEs that will result in increased liking by observers. We also explore whether the anticipated behavioral effects are independent of the previously documented perceptual effects obtained from this experiment.

Method

Participants

Fifty-four women and 25 men participated ($M_{\text{age}} = 19.0$, SD = 1.93). Participants were introductory psychology students, were single and heterosexual, reported English as a first language, and received partial course credit in appreciation of their time.

Procedures and Measures

At individual lab sessions, participants first completed a preliminary survey including Rosenberg's (1965) Self-Esteem Inventory (adapted to a nine-point format from the original four-point format), demographic questions (e.g., age, gender), and filler items to disguise our focus on self-esteem (e.g., leisure activity preferences). Next, participants in the *social threat condition* were informed that there was an opposite-sex participant in the adjacent lab room (i.e., the *partner*), and the participants and their partner would be communicating with one another via video camera. Participants learned that they would first introduce themselves to their interaction partner by speaking into a video camera in the participants' own lab room. The interaction partner would then watch the participants' introductory tape and film a response, which the participants would watch. Following the video-taped interaction, participants believed that they might meet their interaction partner face-to-face. Thus, in the threat condition, there existed the possibility that participants would be rejected by their interaction partner. In contrast, participants in the *control condition* believed that they were part of a control group who would film an introductory videotape to give them "some insight into what the participant before them had to do"; but no one would watch their introductory video. They also believed that after filming their own introductory video, they would watch a response video that had been made by the previous participants' interaction partner. Thus in the control condition, there was no possibility of rejection (for more information about this experimental paradigm, see Cameron et al., 2010).

After learning about these procedures, participants filmed their introductory video, in which they discussed seven general conversation topics (e.g., "What is your dream job?"). Participants' behavior during their introductory video was the focus of the present research. Then, participants watched a response from their interaction partner, which was actually a pre-recorded videotape of a very warm, accepting, and attractive opposite-sex confederate. As reported in Cameron et al. (2010), after watching their partner's response video, participants used a five-point scale (1 = *not at all*, 5 = *most of the time*) to report their interaction partner's use of eight specific *acceptance cues* (i.e., smiling, eye contact,

laughter, flirtatious glances; p. 518), which were summed. Then participants were debriefed concerning the true purposes of the study and awarded their compensation.

Coding participants' behavior. Two trained observers who were blind to participants' self-esteem and experimental condition watched the first 60 seconds of participants' introductory videos (or the entire video if participants spoke for less than 60 seconds; $n = 13$) and rated each participant's *attractiveness* ($r_{ICC} = .61$), *likeability* ($r_{ICC} = .61$), and *approachability* ($r_{ICC} = .67$) using seven-point scale (1 = *not at all*, 7 = *extremely*). Ratings of likeability and approachability were averaged within coders and then between coders to create a reliable *observers' liking* index ($\alpha = .95$). In two subsequent coding sessions, these same coders watched the same video clips and used a five-point scale (1 = *not at all*, 5 = *most of the time*) to rate each participant's use of four *warm behaviors*: smiles, maintains eye contact, laughs, touches face (summed for each coder then averaged across coders, $r_{ICC} = .76$) and four *cold behaviors*: crosses legs,[1] folds arms across chest, avoids eye contact, acts disinterested (summed for each coder then averaged across coders, $r_{ICC} = .84$). Research suggests that impressions of people's behavior based on thin slices are just as accurate as judgments based on longer exposure (i.e., over 5 minutes; Ambady & Rosenthal, 1992). Hence, our method should provide an accurate snapshot of participants' behavior in a first-meeting context.

Results and Discussion

One female participant was excluded because she was skeptical of the cover story, and one male participant was excluded because his taped introduction was missing due to technical issues.

Preliminary Analyses

Participant sex does not moderate the results that follow. Variables assessed, their means and standard deviations, and zero-order correlations are presented in Table 2. As expected, observers' liking of participants was very strongly dependent on participants' warm and cold behaviors.

Attractiveness. Examination of the correlations in Table 2 indicated that attractiveness was moderately associated with observers' ratings of participants' likeability, warm behavior, and cold behavior. To control for both biased perceptions due to attractiveness (e.g., Dion, Berscheid, & Walster, 1972) and actual variance in warmth and social skills due to attractiveness (e.g., Feingold, 1992), we entered attractiveness into the first step of each of the hierarchical regressions that we will describe shortly (for a similar method, see McClure, Lydon, Baccus, & Baldwin, 2010). Controlling for attractiveness in our analyses also increases our statistical power to detect our predicted

TABLE 2 Variables Assessed in Study 1, Their Means and Standard Deviations, and Zero-Order Correlations Among Variables

	M	SD	2	3	4	5
1. Global Self-Esteem	7.14	1.01	.13	.09	.09	−.13
2. Attractiveness	3.73	1.39	–	.43**	.23*	−.29*
3. Liking	4.00	1.22	–	–	.74**	−.50**
4. Warm Behavior	8.85	2.46	–	–	–	−.33**
5. Cold Behavior	10.86	3.13	–	–	–	–

*$p < .05$, **$p < .01$.

effects by reducing the amount of variance attributed to error (e.g., Cohen, 1988). Note that self-esteem and condition did not directly or interactively predict attractiveness (both main-effect ps $> .305$, interaction $p = .991$).

Main Analyses

Observers' liking. We regressed observers' liking of participants onto: Step 1—attractiveness; Step 2—mean-centered self-esteem and dummy coded condition (control = 0, threat = 1); and Step 3—the self-esteem × condition interaction. Results are presented in the top panel of Table 3, and the interaction is depicted in the top panel of Figure 1. In this study and in Study 2, interaction results are graphed for individuals scoring one standard deviation above (HSEs) and below (LSEs) the study mean on the self-esteem scale. The trend was for LSEs to be liked more than HSEs in the control condition, $\beta = -0.23$, 95% confidence interval of the parameter estimate (95% CI) $[-0.64, 0.10]$, $t(72) = -1.46$, $p = .149$, but consistent with H1 (see Table 1), this pattern was reversed in the social threat condition, $\beta = 0.25$, 95% CI $[-0.04, 0.63]$, $t(72) = 1.78$, $p = .080$. Furthermore, LSEs tended to be less liked in the social threat condition than in the control condition, $\beta = -0.27$, 95% CI $[-1.33, 0.05]$, $t(72) = -1.86$, $p = .066$, whereas HSEs tended to be more liked in the social threat condition than in the control condition, $\beta = 0.20$, $t(72) = 1.37$, $p = .174$.

TABLE 3 Results of Hierarchical Regressions Predicting Outcome Variables in Study 1

	β	CI	p	ΔR^2
Liking				
Step 1 (df = 75)				.19
Attractiveness	0.43	[0.20, 0.56]	.000	
Step 2 (df = 73)				.00
SE	0.04	[−0.21, 0.30]	.737	
Condition	−0.04	[−0.60, 0.41]	.716	
Step 3 (df = 72)				.06
SE × condition	0.35	[0.07, 1.16]	.026	
Warm Behavior				
Step 1 (df = 75)				.05
Attractiveness	0.23	[0.01, 0.80]	.049	
Step 2 (df = 73)				.00
SE	0.07	[−0.40, 0.72]	.561	
Condition	−0.01	[−1.12, 1.11]	.986	
Step 3 (df = 72)				.03
SE × condition	0.25	[−0.29, 1.93]	.147	
Cold Behavior				
Step 1 (df = 75)				.08
Attractiveness	−0.29	[−1.14, −0.15]	.011	
Step 2 (df = 73)				.01
SE	−0.10	[−1.01, 0.38]	.378	
Condition	0.03	[−1.21, 1.56]	.802	
Step 3 (df = 72)				.13
SE × condition	−0.54	[−3.54, −0.95]	.001	

Note: The same coders rated all three outcome variables. df, degrees of freedom; SE, self-esteem; CI, 95% confidence interval for the unstandardized parameter estimate; ΔR^2, R-square change.

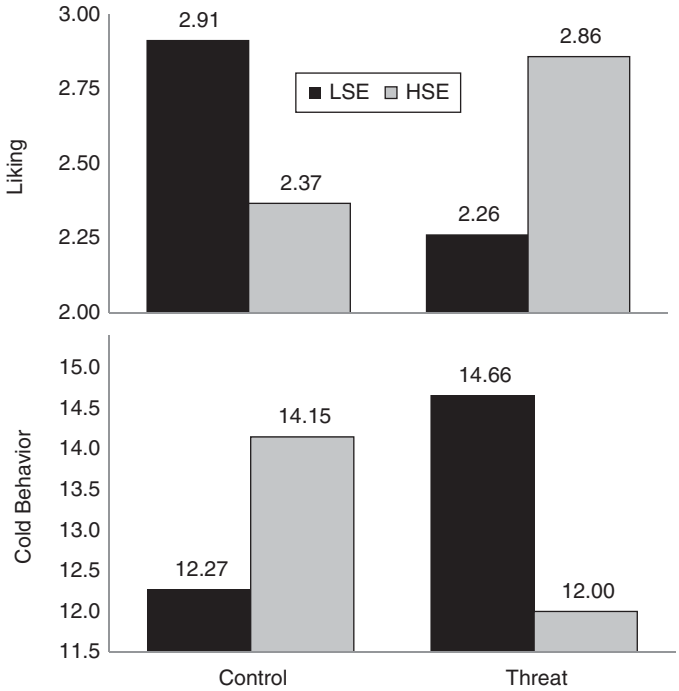

FIGURE 1 Top panel: Liking by observers as a function of self-esteem and threat condition in Study 1. Bottom panel: Observer-rated cold behavior as a function of self-esteem and threat condition in Study 1. *Note*: Results are graphed for individuals scoring one standard deviation above (i.e., HSEs) and below (i.e., LSEs) the study mean on self-esteem.

Warm and cold behaviors. Next, we used the same regression to predict ratings of participants' warm behavior, and the results are presented in the middle panel of Table 3. Surprisingly, and speaking to EH1, self-esteem and condition did not independently or interactively predict participants' use of the warm behaviors that we assessed. In contrast, the results of the same regression predicting participants' cold behavior, presented in the bottom panel of Table 3, yielded an interaction between self-esteem and condition that is depicted in the bottom panel of Figure 1. In the control condition, the trend was for LSEs to exhibit less cold behavior than HSEs, $\beta = 0.30$, 95% CI [-0.04, 1.90], $t(72) = 1.92$, $p = .059$. In contrast, LSEs exhibited more cold behavior than HSEs in the social-threat condition, $\beta = -0.42$, 95% CI [-2.18, -0.44], $t(72) = -3.00$, $p = .004$. Furthermore, consistent with a cooling down response to social threat and supporting H2, LSEs exhibited more cold behavior in the social-threat condition than in the control condition, $\beta = 0.38$, 95% CI [0.55, 4.18], $t(72) = 2.60$, $p = .011$. Consistent with a warming up response to social threat (i.e., a decrease in coldness) and consistent with H3, HSEs exhibited less cold behavior in the social-threat condition than in the control condition, $\beta = -0.34$, 95% CI [-3.98, -0.27], $t(72) = -2.28$, $p = .025$.

Links between behavior and perceptions of acceptance. Participants' perceived acceptance cues from the confederate ($M = 2.45$, SD $= 0.58$; Cameron et al., 2010, p. 518) were negatively correlated with their cold behavior, $r = -.25$, $p = .031$, but unrelated to their warm behavior, $r = .01$, $p = .957$. However, the self-esteem ×

condition interaction predicting observers' liking was maintained even when controlling for participants' perceived acceptance cues, $\beta = 0.39$, 95% CI [0.10, 1.16], $t(71) = 2.36$, $p = .021$, as was the interaction predicting participants' cold behavior, $\beta = -0.48$, 95% CI [−3.39, −0.62], $t(71) = -2.89$, $p = .005$. These results suggest that perceptual and behavioral responses to threat as a function of self-esteem are independent (EH5). We will discuss the implications of these results in the General Discussion after we seek to replicate these findings in Study 2.

Mediated Moderation Analyses

Recall that we predicted in H4 that social threat would cause a cooling down response for LSEs that would result in decreased liking by observers, whereas social threat would cause a warming up response for HSEs that would result in increased liking by observers (i.e., self-esteem × social threat → warm and cold behaviors → observers' liking). This hypothesis reflects *mediated moderation* (e.g., Morgan-Lopez & Mackinnon, 2006; Muller, Judd, & Yzerbyt, 2005), in which paths a_1 and a_2 from the predictor variable (i.e., self-esteem) to the mediators (i.e., warm and cold behaviors) are conditional upon the level of a moderator variable (i.e., social threat), but paths b_1 and b_2 from the mediators to the outcome variable (i.e., observers' liking) are unconditional. The results of the analyses testing this mediated moderation model are presented in Figure 2, and we will detail the steps taken to obtain those results presently.

First, we sought to establish whether paths a_1 and a_2 were moderated by the social threat manipulation. As detailed in Table 3, although social threat clearly moderated the association between self-esteem and cold behavior (i.e., path a_2), social threat did not moderate the association between self-esteem and warm behavior (i.e., path a_1), nor did self-esteem or threat directly predict warmth. At this point, we could omit warm behavior as a mediator in our model, but we decided to leave this variable in the model for two reasons: (1) to determine whether warm and cold behaviors predict liking independent of shared variance between the two behavioral domains; and (2) to determine the proportion of variance in liking that is uniquely predicted by each proposed mediator.

Second, we tested whether paths b_1 and b_2 were statistically significant controlling for all other variables in the model. To test these paths, we added warm behavior and cold behavior to a new Step 4 of our earlier regression predicting liking (see the top panel of Table 3). As expected, warm behavior predicted observers' liking (i.e., path b_1), $\beta = 0.61$, 95% CI [0.23, 0.37], $t(70) = 8.30$, $p < .001$, $\Delta R^2 = .395$, as did cold behavior (i.e., path b_2), $\beta = -0.21$, 95% CI [−0.14, −0.02], $t(70) = -2.57$, $p = .012$, $\Delta R^2 = .103$.[2]

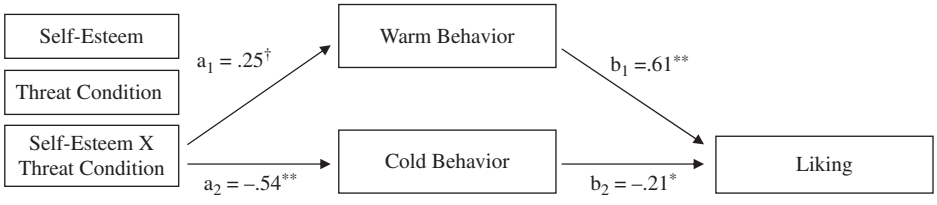

FIGURE 2 Path model depicting the associations among self-esteem, social threat, observer-rated behavior, and observers' liking of participants in Study 1. *Note*: $^{\dagger}p = .15$, $^{*}p < .05$, $^{**}p < .01$. Results were obtained from a series of hierarchical regression analyses described in the main body text. Attractiveness (not depicted) was controlled in all analyses. Path coefficients with $p > .15$ are not depicted in the figure.

Together, these two sets of behaviors explained fully half of the variance in observers' liking of participants.

Finally, we tested whether the moderated indirect paths from the predictor to the outcome variable through each mediator variable were statistically significant (i.e., the product of paths a_1 and b_1, and the products of paths a_2 and b_2). We used Hayes' (2013) PROCESS macro for SPSS using 5000 bootstrap samples to estimate the 95% bias-corrected CI of each moderated indirect path. Using this method, a moderated indirect path is considered statistically significant at $\alpha = .05$, and mediated moderation present, when zero is not contained within the 95% CI. Results revealed that the moderated indirect path through warm behavior (i.e., $a_1 \times b_1$) was not statistically significant, indirect path $= .26$, SE $= .15$, 95% CI [-0.02, 0.57]. In contrast, the moderated indirect path through cold behavior (i.e., $a_2 \times b_2$) was statistically significant, indirect path $= .18$, SE $= .10$, 95% CI [0.03, 0.43]. Consistent with H4, these results indicate that LSEs' cooling down behavioral response to social threat and HSEs' warming up response to social threat—as evidenced by changes in cold behavior—explained why HSEs were liked more than LSEs in the social threat condition.

Summary and Conclusions

As predicted, social threat increased LSEs', but decreased HSEs', use of cold behaviors like avoiding eye contact, using a closed posture, and acting disinterested, and those behavioral differences led LSEs to be liked less than HSEs (H1 to H4, and EH2 in Table 1). However, social threat did not moderate participants' use of warm behaviors as a function of self-esteem (EH1). Consistent with Ms Arnold-Ratliff's quote that opened this paper, these results suggest that self-esteem primarily moderates the use of inhibitory, cold behaviors in response to social threat. The null result for warm behavior could be the result of poor construct conceptualization, whereby the behaviors coded may not reflect warmth. However, the convergent and divergent validity evidence in Table 2 belies this possibility, especially the very strong association between warm behavior and liking, which conceptually replicates the results of prior research (Stinson et al., 2009).

Also intriguing, even though the present results closely parallel the perceptual effects reported previously by Cameron et al. (2010)—for example, social threat increased LSEs' cold behavior and also decreased LSEs' perceptions of acceptance—the presently observed behavioral and liking effects were statistically independent from the previously reported perceptual effects. This observed independence of behavioral and perceptual responses to threat as a function of self-esteem could arise for (at least) one of two reasons: (1) people are not aware of their own warming-up and cooling-down responses to social threat, and thus cannot anticipate the social consequences of their behavior; or (2) people are aware of their behavioral responses to social threat but do not attribute their partners' acceptance to their own behavior (for similar arguments, see Vorauer & Ratner, 1996). We will begin to explore these two possibilities in our second experiment, which assesses participants' self-reported warm and cold behaviors.

There are also a few methodological flaws in the present experiment that need to be addressed. First, we did not include a manipulation check concerning perceptions of social threat: Perhaps HSEs were less threatened than LSEs in the threat condition. Second, the non-social context of the control condition limits the external validity of the present results, especially the negative association between self-esteem and warmth in the control condition. What does it mean to observe that LSEs are warmer than HSEs when presenting themselves in a video that no one will see? Our next study addresses these limitations.

Study 2

Our next experiment uses the same experimental paradigm that was used in the threat condition of Study 1: Single, heterosexual men communicate with a female interaction partner (actually a confederate) via video-taped messages, and the possibility exists that they will have a face-to-face meeting. However, we use a more externally valid manipulation of social threat. In the social threat condition, participants will watch a video in which age-peer actors discuss times when they felt socially anxious, excluded, unsure, or rejected. Such messages can be reassuring when they come from one's interaction partner (e.g., Stinson et al., 2009, Study 2) or when the stories concern the same social context that one is presently facing (e.g., Walton & Cohen, 2011). Because neither of these conditions is met in the social threat condition of the present experiment, we expect that the actors' stories will be threatening, not reassuring, for both LSEs and HSEs, and we include a manipulation check to validate this claim.

Once again, objective observers will report their liking for participants, and will rate participants' attractiveness, which we will control in our analyses. Two additional sets of coders will also rate participants' warm and cold behaviors. Thus, Study 2 improves the method of Study 1 by having independent groups of coders rate all key variables, thereby eliminating shared methods variance and providing a stricter test of our model. A fourth set of coders will also rate another social outcome variable that we expect to be strongly affected by participants' warm and cold behaviors: perceptions of the participants' motivation to initiate a new relationship. As in Study 1, we predict that social threat will cause HSEs to be liked more than LSEs (H1), and we add the prediction that social threat will cause HSEs to appear to be more motivated to initiate a new relationship than LSEs (H5). Moreover, we predict that self-esteem differences in behavioral responses to social threat will explain these effects (H4 and H6). Social threat will cause a cooling down response for LSEs that will both foster the impression that they are not motivated to initiate a new relationship and result in decreased liking by observers. In contrast, social threat will cause a warming up response for HSEs that will both foster the impression that they are strongly motivated to initiate a new relationship and result in increased liking by observers. Participants will also rate their own warm and cold behaviors, which will allow us to determine whether people are self-aware concerning their interpersonal behavior during relationship initiation (EH3).

As in Study 1, we will also examine whether behavioral responses to social threat as a function of self-esteem are independent of similar risk-regulatory effects on perceptions of acceptance (EH4). Furthermore, we will examine whether participants project the anticipated consequences of their self-perceived warm and cold behaviors onto their interaction partner (EH5). If HSEs are aware of their warming-up response to threat, they may anticipate the interpersonal consequences of their warmth and therefore perceive high levels of acceptance from interaction partners. If LSEs are aware of their cooling-down response to threat, they may anticipate the interpersonal effect of their coolness and therefore perceive low levels of acceptance from interaction partners (i.e., self-esteem $\times$ social threat $\rightarrow$ participant-rated warm and cold behaviors $\rightarrow$ perception of acceptance).

Method

Participants

Seventy-six men participated ($M_{\text{age}} = 19.0$, SD $= 1.44$). Participants were introductory psychology students, were single and heterosexual, reported English as a first language, and received partial course credit in appreciation of their time.

Procedure and Measures

The procedure was identical to Study 1 with a few key changes. All participants learned about the threatening communication exercise: Participants believed they might meet their interaction partner after exchanging introductory videos. In addition, prior to filming their own introductory video, participants in the *control condition* watched a 5-minute video about the evolution of birds from dinosaurs, whereas participants in the *social threat condition* watched a 5-minute video in which age-peer actors portraying students related a "story from [their] own life about meeting new people at University." The video included five actors, two males and three females, who varied in attractiveness and gregariousness. However, all actors related stories in which they felt socially anxious, excluded, unsure, or rejected. For example, one female actor's story included the sentence, "I felt so alone even though I was surrounded by so many people and I was really nervous to go up to my classmates and introduce myself."

After watching their respective videos, all participants filmed their introductory video and then watched a response video from their female interaction partner. We used a new confederate video in this study because the video used in Study 1 included "dated" information (e.g., the confederate mentioned a "recent" music concert that was contemporary to data collection for Study 1 but far in the past for Study 2).

Then participants completed a final questionnaire. Among other items not relevant to the present research, participants used a five-point response format (1 = *not at all*, 5 = *most of the time*) to report their interaction partner's use of 10 specific acceptance cues that are commonly expressed by women (i.e., smile, make eye contact, laugh, flirtatious glance, touch face, fix hair, adjust clothing, lick lips, share personal information, act friendly), as well as filler behaviors (e.g., cleared throat). Acceptance cues were summed to yield a *perceived acceptance cues* index. Then, participants reported their *state self-esteem* by rating the extent to which 16 adjectives (e.g., confidence, pride, shame, worthless, stupid, nervous) described their current feelings using a five-point response format (1 = *not at all*, 5 = *extremely*; negative adjectives reverse-coded, $\alpha = .84$; adapted from McFarland & Ross, 1982). Participants also used a five-point scale (1 = *not at all*, 5 = *most of the time*) to report their own use of four warm behaviors (i.e., smile, make eye contact, laugh, touch face), four cold behaviors (i.e., cross legs, fold arms across chest, avoid eye contact, act disinterested), and filler behaviors (e.g., cleared throat). Self-ratings for warm and cold behaviors were summed to create a *participant-rated warm behavior* index and a *participant-rated cold behavior* index, respectively. After completing this questionnaire, participants were debriefed as to the true purposes of the study and awarded their compensation.

Coding participants' behavior. At a later date, three trained observers watched the first 60 seconds of each participant's taped introduction and rated each participant's *attractiveness* ($\alpha = .73$), *likeability* ($\alpha = .64$), and *approachability* ($\alpha = .72$) using a seven-point scale (1 = *not at all*, 7 = *extremely*). Ratings of likeability and approachability were averaged to create a reliable *liking* index ($\alpha = .97$). In an independent coding session, a second set of two coders watched the same 60-second clip and used the same seven-point scale to rate each participant's *motivation* for the initiation task ($r_{\mathrm{ICC}} = .73$), *eagerness* ($r_{\mathrm{ICC}} = .72$), and *engagement* in the initiation task ($r_{\mathrm{ICC}} = .73$). Ratings of all three variables were averaged within and then between coders to create a reliable *initiation motivation* index ($\alpha = .96$). Then, a third set of two coders watched the same video clips and used a five-point scale (1 = *not at all*, 5 = *most of the time*) to rate each participant's use of four *warm behaviors* (i.e., smile, maintain eye contact, laugh, touch face; summed for each coder then averaged across coders,

$r_{ICC} = .76$), and a fourth set of two coders rated each participant's use of three *cold behaviors* (i.e., cross legs, avoid eye contact, act disinterested; summed for each coder then averaged across coders, $r_{ICC} = .75$).[3] Observers were blind to participants' self-esteem and experimental condition.

Results and Discussion

One participant was excluded because he was more than three standard deviations below the mean on global self-esteem, and another was excluded because he was similarly extreme on three other scales.

Preliminary Analyses

Variables assessed their means and standard deviations, and the zero-order correlations among variables are presented in Table 4.

Manipulation check. We regressed participants' state self-esteem onto: Step 1—mean-centered self-esteem and dummy-coded condition (control = 0, threat = 1), and Step 2—the interaction between variables. Results revealed that HSEs reported higher state self-esteem than LSEs, $\beta = 0.31$, 95% CI [0.05, 0.27], $t(70) = 2.83$, $p = .006$. Results also revealed that compared to participants in the control condition ($M = 3.93$, SD = 0.43), participants in the threat condition reported lower state self-esteem ($M = 3.65$, SD = 0.56), $\beta = -0.24$, 95% CI [−0.47, −0.03], $t(70) = -2.23$, $p = .029$. Global self-esteem did not moderate this effect, $\beta = 0.15$, 95% CI [−0.11, 0.34]. $t(70) = 1.01$, $p = .317$. Because decreases in state self-esteem signal that one perceives the presence of social threats (Leary, Tambor, Terdal, & Downs, 1995), these results suggest that our social threat manipulation was successful.

Zero-order correlations among variables. A few associations are worth noting in Table 4. First, as in Study 1, attractiveness was strongly associated with liking, and even though different sets of coders rated each variable, attractiveness was also moderately correlated with observers' ratings of participants' initiation motivation and cold behavior. And once again, self-esteem and condition did not directly or interactively predict attractiveness (both main-effect ps $> .128$, interaction $p = .724$). Therefore, as in Study 1, we entered attractiveness into the first step of each of the hierarchical regressions that we will describe shortly. Second, observers' liking for participants was very strongly correlated with observers' impressions of participants' initiation motivation, even though, once again, these two variables were rated by different sets of coders. Therefore, observers liked the participants who most clearly exhibited their own eagerness to initiate a new relationship, a result consistent with prior research demonstrating the reciprocal nature of liking in social relationships (e.g., Asendorf, Penke, & Back, 2011). Finally, the positive correlations between observers' and participants' reports of participants' warm and cold behaviors suggest that participants are self-aware concerning their own warm and cold behaviors during relationship initiation (EH3). In particular, participants were remarkably accurate in their perceptions of their own cold behavior.

Main Analyses

We conducted a series of hierarchical regressions predicting each of the four observer-rated variables (i.e., liking, initiation motivation, and warm and cold behaviors) and each of the three participant-rated variables (i.e., warm and cold behaviors, and perceived

TABLE 4 Variables Assessed in Study 2, Their Means and Standard Deviations, and Zero-Order Correlations Among Variables

	M	SD	2	3	4	5	6	7	8	9	10
1. Global Self-Esteem	7.21	1.00	.34**	.13	.17	−.02	.14	−.10	.26*	−.22†	.22†
2. State Self-Esteem	3.80	0.51	–	.32**	.27*	.10	−.03	−.20	.06	−.21†	.09
3. Attractiveness (OR)	3.99	0.94	–	–	.66**	.34**	.18	−.30**	.02	−.14	.03
4. Liking (OR)	4.64	0.96	–	–	–	.77**	.41**	−.63**	.26*	−.41**	.15
5. Initiation Motivation (OR)	4.75	1.41	–	–	–	–	.46**	−.65**	.24*	−.40**	.05
6. Warm Behavior (OR)	8.11	2.25	–	–	–	–	–	−.26*	.33**	−.27*	−.05
7. Cold Behavior (OR)	6.92	1.96	–	–	–	–	–	–	−.33**	.63**	−.16
8. Warm Behavior (PR)	8.97	2.50	–	–	–	–		–	–	−.17	.25*
9. Cold Behavior (PR)	6.19	2.50	–	–	–	–		–	–	–	.01
10. Perceived Acceptance Cues (PR)	25.94	4.03	–	–	–	–		–		–	–

Note: OR, observer rated; PR, participant rated.
†$p < .08$, *$p < .05$, **$p < .01$.

TABLE 5 Results of Hierarchical Regressions Predicting Observer-Rated Outcome Variables in Study 2

	β	CI	p	ΔR^2
Liking (OR)				
Step 1 (df = 72)				.43
Attractiveness	0.65	[0.48, 0.85]	.000	
Step 2 (df = 70)				.01
SE	0.09	[−0.09, 0.26]	.344	
Condition	0.06	[−0.24, 0.46]	.550	
Step 3 (df = 69)				.04
SE × condition	0.26	[0.04, 0.72]	.030	
Initiation Motivation (OR)				
Step 1 (df = 71)				.12
Attractiveness	0.34	[0.18, 0.84]	.003	
Step 2 (df = 69)				.02
SE	−0.06	[−0.43, 0.28]	.634	
Condition	0.13	[−0.30, 1.00]	.283	
Step 3 (df = 68)				.01
SE × condition	0.17	[−0.32, 1.06]	.291	
Warm Behavior (OR)				
Step 1 (df = 72)				.03
Attractiveness	0.18	[−0.11, 0.99]	.118	
Step 2 (df = 70)				.07
SE	0.15	[−0.19, 0.85]	.211	
Condition	0.24	[0.01, 2.09]	.047	
Step 3 (df = 69)				.02
SE × condition	−0.21	[−1.74, 0.32]	.173	
Cold Behavior (OR)				
Step 1 (df = 72)				.09
Attractiveness	−0.30	[−1.09, −0.16]	.009	
Step 2 (df = 70)				.06
SE	−0.08	[−0.59, 0.28]	.467	
Condition	−0.23	[−1.79, −0.03]	.042	
Step 3 (df = 69)				.05
SE × condition	−0.30	[−1.77, −0.05]	.038	

Note: Each outcome variable was rated by a different set of coders. Degrees of freedom vary due to missing data for some variables. OR, observer rated; df, degrees of freedom; SE, self-esteem; CI, 95% confidence interval for the unstandardized parameter estimate; ΔR^2, *R*-square change.

acceptance cues). The results of these regressions are presented in Tables 5 and 6. These interactions took the same form, so for illustrative purposes we have depicted the interaction between self-esteem and condition predicting observers' liking in Figure 3. We will interpret these findings presently.

Liking and initiation motivation. Observers' liking of participants revealed the anticipated interaction between self-esteem and social threat condition. Although self-esteem was unrelated to liking in the control condition, $\beta = -0.08$, 95% CI [−0.30, 0.15], $t(69) = -0.70$, $p = .486$, as anticipated by H1, self-esteem was positively related to liking in the threat condition, $\beta = 0.31$, 95% CI [0.04, 0.56], $t(69) = 2.32$, $p = .024$. This condition difference was primarily driven by HSEs, who tended to be more liked in the threat condition than in the control condition, $\beta = 0.23$, 95% CI [−0.02, 0.89], t

TABLE 6 Results of Hierarchical Regressions Predicting Participant-Rated Outcome Variables in Study 2

	β	CI	p	ΔR^2
Warm Behavior (PR)				
Step 1 (df = 71)				.00
Attractiveness	0.02	[−0.57, 0.68]	.858	
Step 2 (df = 69)				.10
SE	0.28	[0.12, 1.28]	.018	
Condition	0.17	[−0.33, 1.99]	.156	
Step 3 (df = 68)				.00
SE × condition	0.03	[−1.07, 1.27]	.864	
Cold Behavior (PR)				
Step 1 (df = 70)				.02
Attractiveness	−0.14	[−1.00, 0.44]	.226	
Step 2 (df = 68)				.04
SE	−0.21	[−1.13, 0.06]	.079	
Condition	−0.03	[−1.34, 1.03]	.795	
Step 3 (df = 67)				.09
SE × condition	−0.41	[−2.69, −0.40]	.009	
Perceived Acceptance Cues (PR)				
Step 1 (df = 72)				.00
Attractiveness	0.03	[−0.87, 1.14]	.793	
Step 2 (df = 70)				.05
SE	0.23	[−0.04, 1.87]	.059	
Condition	0.06	[−1.45, 2.36]	.636	
Step 3 (df = 69)				.06
SE × condition	0.33	[0.18, 3.92]	.032	

Note: Degrees of freedom vary due to missing data for some variables. PR, participant rated; df, degrees of freedom; SE, self-esteem; CI, 95% confidence interval for the unstandardized parameter estimate; ΔR^2, R-square change.

(69) = 1.92, $p = .059$. In contrast, and refuting H5, observers' impressions of participants' initiation motivation were not directly predicted by self-esteem, condition, or their interaction. We will examine indirect effects on initiation motivation via warm and cold behaviors shortly.

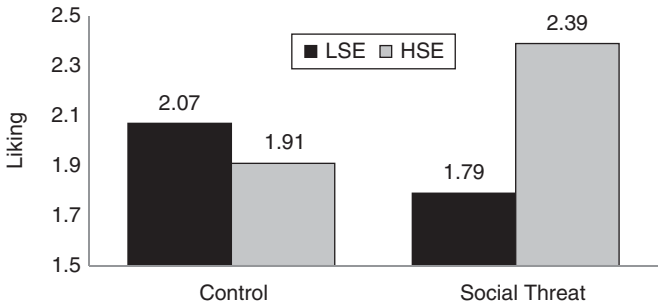

FIGURE 3 Liking by observers as a function of self-esteem and social threat condition in Study 2. *Note*: Results are graphed for individuals scoring one standard deviation above (i.e., HSEs) and below (i.e., LSEs) the study mean on self-esteem.

Warm behavior. Observers perceived that participants behaved more warmly in the social threat condition than in the control condition, suggesting that participants experienced a warming-up response to the social threat manipulation, regardless of their level of self-esteem. This result is consistent with the sociometer account of the social-regulatory function of self-esteem, which suggests that threats to belonging will prompt efforts to connect with social partners (Leary, 2004). Participants themselves did not detect a similar condition effect on their own behavior, though the trend in participant-reports was in the same direction as the condition effect on observer-reports. However, across conditions, LSEs reported less warm behavior than HSEs. Observers did not detect a parallel self-esteem difference in warm behavior, but the trend in observers' reports of participants' warmth as a function of self-esteem was in the same direction. Remember that the experimental context was the same as the high threat condition in Study 1. Thus, the main effect of self-esteem on warm behavior suggests that the level of social threat present in both experimental conditions may have been sufficient to activate LSEs' cooling-down response to social threat (H2), and this response was not moderated by the additional threat induced by our experimental manipulation.

Cold behavior. Observer- and participant-reports of participants' cold behavior were remarkably consistent (see Table 4), and analyses of both variables revealed the anticipated self-esteem × condition interaction. According to objective observers, self-esteem was unrelated to cold behavior in the control condition, $\beta = 0.12$, 95% CI [−0.34, 0.79], $t(69) = 0.80$, $p = .423$, but negatively related to cold behavior in the social threat condition, $\beta = -0.35$, 95% CI [−1.34, −0.03], $t(69) = -2.08$, $p = .041$. Participant reports showed a similar pattern: control condition, $\beta = 0.06$, 95% CI [−0.62, 0.92], $t(67) = 0.40$, $p = .694$; threat condition, $\beta = -0.55$, 95% CI [−2.25, −0.54], $t(67) = -3.25$, $p = .002$. These condition differences were driven by HSEs, who decreased their use of cold behaviors following social threat according to both observers, $\beta = -0.44$, 95% CI [−2.84, −0.56], $t(69) = -2.98$, $p = .004$, and participants themselves, $\beta = -0.31$, 95% CI [−3.06, −0.01], $t(67) = 2.00$, $p = .049$, results indicative of a warming-up response to social threat (H3). LSEs' cold behavior did not vary across conditions.

Perceived acceptance cues. Analysis of participants' perceived acceptance cues from the female confederate also revealed a self-esteem × condition interaction. Self-esteem did not predict perceived acceptance cues in the control condition, $\beta = 0.01$, 95% CI [−1.18, 1.27], $t(69) = 0.07$, $p = .945$, but HSEs perceived more acceptance than LSEs in the social threat condition, $\beta = 0.51$, 95% CI [0.68, 3.51], $t(69) = 2.95$, $p = .004$. Once again, this effect was driven by HSEs, who tended to perceive more acceptance in the threat condition than in the control condition, $\beta = 0.28$, 95% CI [−0.23, 4.70], $t(69) = 1.81$, $p = .075$. These results conceptually replicate those of Cameron et al. (2010) using a new and unconfounded manipulation of social threat, and using a different confederate video and more comprehensive index of acceptance cues.

Exploring links between the observed behavioral and perceptual effects. Supporting the independence of the observed behavioral and perceptual effects and conceptually replicating the results of Study 1 (EH5), controlling for participants' perceived acceptance cues did not alter the magnitude of the previously reported self-esteem × condition interactions predicting observers' liking for participants, $\beta = 0.23$, 95% CI [−0.01, 0.70]. $t(68) = 1.95$, $p = .056$; observers' reports of participants' cold behavior, $\beta = -0.28$, 95% CI [−1.72, 0.06]. $t(68) = -1.86$, $p = .068$; or participants' reports of their own cold

behavior, $\beta = -0.45$, 95% CI [-2.86, -0.52], $t(66) = -2.89$, $p = .005$ (although the p-values of the interaction terms were affected by the decreased degrees of freedom in these analyses). Nor did controlling for perceived acceptance cues alter the magnitude of the main effect of self-esteem on participant-reported warm behavior, $\beta = 0.23$, 95% CI [-0.00, 1.17], $t(68) = 1.98$, $p = .051$, or the main effect of condition on observer-rated warm behavior, $\beta = 0.24$, 95% CI [0.04, 2.12], $t(69) = 2.07$, $p = .043$ (although once again the p-values of the main effects were affected by the decreased degrees of freedom in these analyses). Moreover, when we included participant-reports of cold behavior in a new Step 4 of the regression described in Table 6 predicting perceived acceptance cues, the self-esteem × condition interaction predicting perceived acceptance still emerged and cold behavior was unrelated to perceived acceptance cues, $\beta = 0.15$, 95% CI [-0.15, 0.61], $t(66) = 1.22$, $p = .228$. This null result speaks to EH5, indicating that self-esteem differences in self-reported cold behavior as a function of social threat do not explain self-esteem differences in perceptions of acceptance as a function of social threat. Put another way, participants are aware of variations in their cold behavior as a function of social threat, but they do not appear to project the social consequences of their behavior onto their interaction partner. We will discuss the implications of these findings more thoroughly in the General Discussion.

Mediated Moderation Analyses

Next, we sought to determine whether participants' warm and cold behaviors explain variation in observers' liking and perceptions of participants' initiation motivation as a function of self-esteem and social threat. To simplify our analyses and to provide the most comprehensive picture of the processes in question, we standardized and then averaged participant- and observer-reports of participants' warm ($\alpha = .49$)[4] and cold behaviors ($\alpha = .77$) and used these two composite variables in the analyses that follow.[5]

Recall that we originally predicted in H4 and H6 that social threat would cause a cooling down response for LSEs that would result in decreased liking and perceptions of initiation motivation by observers, whereas social threat would cause a warming up response for HSEs that would result in increased liking and perceptions of initiation motivation by observers (i.e., self-esteem × social threat → warm and cold behaviors → observers' liking and perceptions of initiation motivation). However, the results that we have presented thus far in Tables 5 and 6 indicate that self-esteem and social threat directly predict warm behavior, whereas self-esteem and social threat interact to predict cold behavior. These results suggest three updated mediation models that we tested in a series of hierarchical regression analyses, the results of which are presented simultaneously in Figure 3. We will detail the nature of these three updated models and the steps taken to obtain the results depicted in Figure 3 presently.

First, HSEs' greater use of warm behaviors relative to LSEs across conditions will lead to greater liking and perceptions of initiation motivation for HSEs than LSEs across conditions (i.e., self-esteem → warm behavior → observers' liking and perceptions of initiation motivation). Second, participants' greater use of warm behaviors in the social threat condition than in the control condition will lead to greater liking and perceptions of initiation motivation in the social threat condition than in the control condition (i.e., condition → warm behavior → observers' liking and perceptions of initiation motivation). These two models concerning warm behavior reflect simple mediation, whereby none of the paths in the model is moderated. The third model concerning cold behavior is consistent with our original mediated moderation hypotheses, whereby HSEs' decreased use of cold behaviors in response to social threat will lead to greater liking and perceptions of initiation motivation for HSEs than LSEs in the social threat condition

(i.e., self-esteem × social Threat → cold behavior → observers' liking and perceptions of initiation motivation).

First, we sought to establish whether self-esteem and threat condition each predict the new composite measure of warm behavior (i.e., paths a_1 and a_2), and whether the path from self-esteem to the new composite measure of cold behavior was moderated by the social threat manipulation (i.e., path a_3). We tested these paths in two hierarchical regressions of the same form as the analyses reported in Tables 5 and 6. As expected, self-esteem directly predicted the warm behavior composite, $\beta = 0.26$, 95% CI [0.03, 0.40], $t(69) = 2.32$, $p = .023$, as did social threat $\beta = 0.24$, 95% CI [0.03, 0.76], $t(69) = 2.14$, $p = .036$. Self-esteem and condition did not interact to predict warm behavior, $\beta = -0.11$, 95% CI [−0.51, 0.23], $t < 1$. In contrast, self-esteem and social threat did not directly predict cold behavior, both ps $> .194$, but they did interact in the anticipated manner, $\beta = -0.40$, 95% CI [−0.95, −0.16], $t(69) = -2.78$, $p = .007$.

Second, we tested whether the paths from warm and cold behaviors to observers' liking and perceptions of initiation motivation (i.e., paths b_{11} to b_{22} in Figure 4) were statistically significant controlling for all other variables in the model. We tested these paths in two hierarchical regressions in which the warm and cold behavior composites were added to a new Step 4 of the regressions described in Table 5 predicting observers' liking and perceptions of initiation motivation. All four paths were statistically significant: b_{11}, $\beta = 0.26$, 95% CI [0.11, 0.49], $t(67) = 3.16$, $p = .002$; b_{12}, $\beta = 0.29$, 95% CI [0.15, 0.86], $t(67) = 2.83$, $p = .006$; b_{21}, $\beta = -0.33$, 95% CI [−0.53, −0.18], $t(67) = -3.97$, $p < .001$; b_{22}, $\beta = -0.46$, 95% CI [−1.05, −0.39], $t(67) = -4.36$, $p < .001$.

As in Study 1, we used Hayes' (2013)PROCESS macro for SPSS using 5000 bootstrap samples to estimate the 95% bias-corrected CI of each indirect path in Figure 4. Each indirect path depicted was statistically significant: $a_1 \times b_{11}$, indirect path = .05, SE = .03, 95% CI [0.01, 0.11]; $a_1 \times b_{12}$, indirect path = .09, SE = .06, 95% CI [0.00, 0.24]; $a_2 \times b_{11}$, indirect path = .19, SE = .06, 95% CI [0.00, 0.25]; $a_2 \times b_{12}$, indirect path = .16, SE = .12, 95% CI [0.01, 0.51]; $a_3 \times b_{21}$, indirect path = .20, SE = .11, 95% CI [0.03, 0.47]; and $a_3 \times b_{22}$, indirect path = .41, SE = .20, 95% CI [0.08, 0.86]. HSEs' greater use of warm behaviors relative to LSEs across conditions led to greater liking and perceptions of initiation motivation for HSEs than LSEs across conditions. Participants' greater use of warm behaviors in the social threat condition than in the control condition led to greater liking and perceptions of initiation motivation in the social threat condition than in the control condition. Furthermore, HSEs' warming-up response (i.e., decreases in cold behavior) to social threat led to greater liking and perceptions of initiation motivation for HSEs than LSEs in the social threat condition.

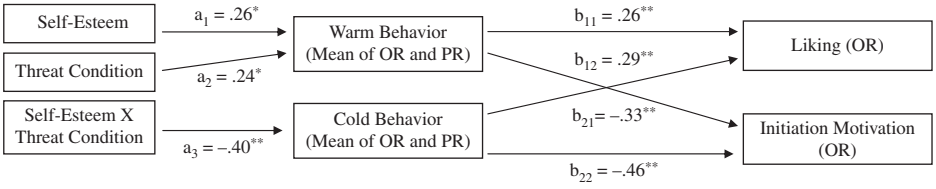

FIGURE 4 Path model depicting the associations among self-esteem, social threat, behavior, and observers' impressions in Study 2. *Note*: $*p < .05$, $**p < .01$. Results were obtained from a series of hierarchical regression analyses described in the main body text. Attractiveness (not depicted) was controlled in all analyses. Path coefficients with $p > .05$ are not depicted in the figure. OR, observer rated; PR, participant rated.

Summary and Conclusions

Taken together, these results suggest that participants' warm and cold behaviors during relationship initiation, particularly in response to social threat, predict consequential social outcomes. Consistent with the sociometer theory prediction that threats to belonging can prompt affiliation behaviors aimed at improving one's relational value (Leary, 2004), social threat caused both LSEs and HSEs to behave more warmly. Such warm behaviors were effective: Threatened participants were perceived to be particularly motivated to initiate a new relationship and threatened participants were liked more than control participants. However, this positive outcome of threat was tempered for LSEs. Due to the independent main-effect of self-esteem on warm behavior, HSEs were perceived to be more strongly motivated to initiate a relationship and were liked more than LSEs across experimental conditions. HSEs' more positive social outcomes in this relationship initiation context were even more pronounced in the social threat condition because HSEs' decreased use of cold behaviors additionally improved their social outcomes relative to LSEs' outcomes. Taken together, these results suggest that HSEs will experience more positive outcomes than LSEs during relationship initiation, due to self-esteem differences in *both* warm and cold behaviors.

The present experiment had limitations that are worth noting. We sampled only male participants to avoid the need to obtain a sample large enough to reliably test for sex effects. But we believe that the observed processes function similarly for women during relationship initiation; the results of Study 1, which included mostly female participants, support this contention (see also, Stinson et al., in press). However, the self-reported results in the present experiment need to be replicated among women. Another limitation concerns the directionality of the present condition effects. We proposed that our social threat condition introduced additional social threats into the situation, and our manipulation check was consistent with this account. But it is also possible that our control condition created a transcendent state (e.g., Williams & Harvey, 2001) that buffered participants against naturally occurring social threats, or distracted participants from the situation and thus eliminated self-esteem differences in interpersonal risk-regulation (e.g., Cavallo et al., 2012). Both of these possibilities are intriguing, and future researchers should explore whether simple distraction or priming a transcendent state can buffer individuals against belonging threats.

General Discussion

The results that we have described present a complex picture of the associations among self-esteem, social threat, behavior, and social outcomes. When social threats were absent, LSEs exhibited equal (Study 2), or even less (Study 1), cold behavior than HSEs, and LSEs were liked by observers just as much as HSEs (Studies 1 and 2). Such results firmly contradict the notion that lower self-esteem is synonymous with poor social skills and social inhibition, an assumption evident in common wisdom and the popular media. However, many social interactions do include actual or potential social threats that will reveal self-esteem differences in behavior according to the present research. When social threat was present, LSEs behaved more coldly than HSEs according to both observer-reports (Studies 1 and 2) and self-reports (Study 2). HSEs responded to social threat by dramatically decreasing their use of cold behaviors like closed posture and averted gaze, whereas LSEs remained equally cool and disengaged (Study 2), or even became more cold (Study 1) when social threat was present. In turn, HSEs' warming-up response and LSEs' cooling-down response to social threat led observers to like HSEs more than LSEs (Studies 1 and 2) and to report that HSEs appeared more eager and motivated to initiate a new relationship than LSEs (Study 2). Thus, lay theories equating lower self-esteem with social reticence may contain a kernel of truth,

especially in socially threatening situations. Our results also suggest a self-fulfilling component to the high level of stability that researchers have documented for global self-esteem during adulthood (e.g., Trzesniewski, Donnellan, & Robins, 2003), because HSEs' and LSEs' behavioral responses to social threat resulted in social outcomes consistent with their high and low chronic perceived relational value, respectively.

Our results also revealed that participants are aware of their own behavior. Participants' self-rated warm and cold behaviors each correlated positively with observers' impressions, and participants' self-rated cold behavior varied as a function of self-esteem and social threat in the same manner that observer-ratings varied. So, just as Ms Arnold-Ratliff was aware of her own cooling-down response to perceived social threats in the passage that opened this paper, participants in Study 2 were aware of their own use of specific warm and cold behaviors. If people are aware that they regulate their social behavior in response to social threats, such awareness could potentially buffer LSEs against the negative repercussions of their cool interpersonal behavior by implying an internal locus on control: if they change their behavior, may be they can improve their social experiences.

Unfortunately, our research suggests a disconnect between participants' awareness of their own behavior and their awareness of the effects of their behavior on their social outcomes. If participants were aware of the effect of their own behavior on their social outcomes, then we should have observed a negative correlation between self-rated cold behavior and perceived acceptance (i.e., "If I act cold, then others won't like me"). Instead, the behavioral responses to social threat as a function of self-esteem that we documented in our studies were independent of participants' perceptions of acceptance from their interaction partner. Thus, the present research provides some insight into the social-psychology of relationship initiation: people possess remarkable insight concerning their behavioral responses to social threat during relationship initiation, yet consistent with prior research documenting pluralistic ignorance during relationship initiation (Vorauer & Ratner, 1996), people remain ignorant of the link between their own behavior and acceptance by others.

Some additional contributions of the present research should also be highlighted. First, our novel manipulation of social threat in Study 2 succeeded in threatening both LSEs' and HSEs' relational value, a relatively rare occurrence in the literature. Typically, LSEs are more affected by threats to relational value than HSEs, who often seem impervious to social threats (e.g., Murray, Rose, Bellavia, Holmes, & Kusche, 2002). Our indirect threat manipulation seemed to bypass HSEs' defenses, and thus may be a methodological contribution that is useful to future researchers. Second, our research revealed that self-esteem differences in behavior and social outcomes as a function of threat are independent of similar self-esteem differences in perceptions of acceptance as a function of social threat. This suggests that people's perceptions of acceptance and their use of warm social behaviors are not simply the same effects wearing different psychological clothing. Rather, it seems that interpersonal risk-regulation responses to threat prompt independent responses in the behavioral and perceptual domains. Future research should attempt to isolate the psychological mechanisms that differentiate these two responses, with a particular focus on elucidating the apparent disconnect between people's self-awareness concerning their own behavior and their (lack of) awareness concerning the influence of their behavior on their interaction partners.

Notes

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1. Cameron et al. (2010) included crossing legs in their acceptance cues composite. Although lay theories suggest that crossing one's legs toward one's partner can indicate liking (e.g., Potter, 2014), empirical evidence suggests that crossed legs is a closed posture that conveys a lack of romantic desire (especially when enacted by men; e.g., Grammer, 1990). Cameron and colleagues choice to include crossed legs in their acceptance cues variable was not particularly consequential, because the confederates did not cross their legs in the response videos that participants rated. However, when assessing participants' own behavior in the present research, we have opted to conceptualize leg crossing as a cold behavior indicative of romantic disinterest.
2. Cold behavior still predicted liking when warm behavior was not included in the model, $\beta = -0.34$, 95% CI $[-0.22, -0.05]$, $t(71) = -3.07$, $p = .003$, $\Delta R^2 = .091$, $p = .003$.
3. Coders also rated participants' frequency of crossing their arms across their chests, but one coder perceived that no participants engaged in this behavior. This behavior was omitted from the composite variable described in text.
4. Although the reliability of this composite is lower than ideal, it is common for researchers to aggregate and analyze reports of behavior from different sources to gain a complete picture of the behavior in question, even when sources do not agree at conventionally accepted levels (e.g., mother, father, and teacher reports of a child's behavior; Koss et al., 2013).
5. We conducted two additional sets of mediation analyses, one using participant-reported mediators and the other using observer-reported mediators. The results of those supplemental analyses were remarkably consistent with the analyses we report in the main body text, and can be found in the Supplementary Materials for this manuscript, available at http://home.cc.umanitoba.ca/~cameron2/.

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