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A secret language of aggression: disgust expressions are treated as cues of impending social exclusion among women

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Attending to women's intrasexual competition generates a straightforward prediction: Insofar as women actors sometimes use distinct tactics of aggression (e. g., related to social exclusion), *women targets* might possess distinct interpretations of and reactions to those tactics. We test this using one such tactic common among women: disgust expressions directed at targets of desired social exclusion. Across four experiments with U.S. adults (N = 1,019), women (more than men) (1) interpret same-gender disgust (but not anger) facial expressions potentially directed toward them as cues of impending social exclusion, and (2) report being hurt in reaction to these expressions, whether imagined or recalled. Further, (3) women (but not men) who are more dispositionally concerned with social belonging (but not vulnerability to disease) report greater hurt. Women seem to possess distinct interpretations of and reactions to aggression tactics that they uniquely and recurrently face. Identifying these often lesser-studied challenges women face may reveal additional, overlooked features of women's strategic social cognition and behavior.

KEYWORDS

women's sociality, sex/gender, aggression, indirect aggression, disgust, social exclusion, task analysis

1 Introduction

Despite a focus on aggression from its inception, social psychology and related areas have historically overlooked the types of aggression typically associated with girls and women (e.g., Maccoby and Jacklin, 1974; Krems et al., 2020; Fisher and Krems, 2023). Today, there is wide consensus that, like men, women engage in impactful aggression. However, unlike men, women often eschew more overt and physical tactics (e.g., violence) typically preferring tactics that can be employed more covertly (e.g., gossip), especially when aggressing against other women (Burbank, 1987; Lagerspetz et al., 1988; Bjorkqvist et al., 1994; Crick and Grotpeter, 1995; Galen and Underwood, 1997; Campbell, 1999, 2002; Underwood, 2003, 2004; Hess and Hagen, 2006, 2019; Vaillancourt, 2013; Arnocky, 2017; Reynolds and Palmer-Hague, 2022). Although these non-physical tactics may be less lethal than genuine violence, they can nevertheless assassinate targets' reputations and relationships (Hess and Hagen, 2006, 2021; Vaillancourt and Sharma, 2011; Benenson, 2013; Hess, 2022).

The current work is based on a straightforward premise, but one unexamined owing to an historical implicit focus on men's social cognition and behavior: If women recurrently *employ* some distinct tactics of intrasexual aggression, then—as targets—women also recurrently *face* some distinct tactics of intrasexual aggression. Women might thus also possess social cognitive repertoires for managing with these recurrently-faced tactics as targets (Krems et al., 2015, 2016, 2020, 2022, 2023). For example, if certain facial expressions, phrases, or intonations have distinct and potentially aggressive meaning among women (Campbell, 2002; Reynolds, 2022; Reynolds and Palmer-Hague, 2022; e.g., You're so adorable, I love how hard she tries), women might have distinct responses to them. We examine this possibility with respect to a tactic of aggression more common among women (disgust facial expressions) that seems used to facilitate an aggressive outcome (social exclusion) perhaps also more common among women (Benenson et al., 2008c, 2013; Benenson, 2013).

1.1 Disgust expressions as signals of exclusion among women?

We (1) identify a tactic of social exclusion considered much more common among girls and women: facial expressions of disgust directed toward targets the expresser intends to exclude (Brown and Gilligan, 1993; Owens et al., 2000; Underwood et al., 2004). Intrasexual social exclusion itself is arguably more common among girls and women than boys and men (Feshbach, 1969; Feshbach and Sones, 1971; Baker, 1994; Campbell, 2002; Underwood, 2003; Underwood et al., 2004; Benenson et al., 2008a,b,c, 2011, 2013; Benenson, 2013, 2014; Krems et al., 2015; Arnocky, 2016; Williams et al., 2016, 2022; Ayers et al., 2023). There also seem to be sex/gender differences in the preferred tactics to facilitate such intrasexual exclusion (Underwood et al., 2004; Benenson, 2013). That is, whereas there are multiple ways to exclude a peer—such as shoving a person while yelling, "Scram; we don't want you here!"—girls and women tend to favor subtler tactics, such as non-verbal expressions of exclusionary intent (e.g., Björkqvist, 1994; Bjorkqvist et al., 1994; Campbell, 1999; Underwood, 2004; Vaillancourt, 2013). Here, we zero in on one tactic of social exclusion seemingly much more frequent among women: dirty looks—and, in particular, facial expressions of disgust to communicate the expresser's desire to keep that peer socially distanced from oneself and one's group (Hines and Fry, 1994; Shute et al., 2002; Underwood, 2004; Vaillancourt and Sharma, 2011).

We (2) derive and test predictions about women targets' reactivity to this potential cue of impending exclusion, which women might recurrently—and uniquely—face. Again, our key argument is that, insofar as women (vs. men) are more likely to recurrently encounter disgust expressions from same-sex/gender excluders, women might possess distinct interpretations of and reactions to other women's expressions of disgust.

Thus, here, we test whether (a) women possess distinct interpretations and (b) affective reactions to other women's facial expressions of disgust. We predict that, compared to men, women will be more likely to interpret ambiguously directed facial expressions of disgust from same-gender expressers as cues of expresser intent to exclude them and also that women will report greater hurt in reaction to these cues. We also test (c) if these reactions are consistent with such expressivity being a cue of social exclusion in this interpersonal context (i.e., among women). Specifically, if the above logic is correct, then those women who are most dispositionally concerned with being socially excluded would report being especially hurt by cues they interpret as communicating exclusionary intent (i.e., by other women's disgust expressions). We test these predictions, their specificity [i.e., women's greater hurt reactivity to other women's (but not men's) disgust expressions], and alternative possibilities for the predicted patterns of findings. Data and code are available on Open Science Framework: https://osf.io/4hbkp/.

2 Experiment 1

Experiment 1 tests the prediction that women (more than men) interpret facial expressions of disgust from same- gender expressers as meaning that the expresser wants to socially exclude or avoid them. Women and men were asked to imagine themselves at a social event where they were in conversation with a same-gender stranger they were interested in befriending. While in conversation, they catch the person flashing a look—of either disgust or anger—potentially at them.

We include anger expressions to test the specificity of the predicted effect: even as both disgust and anger expressions may be associated with impending aggression, disgust generally cues expressers' desire for distance from targets, whereas anger generally cues expressers' desire to physically harm targets (e.g., Wilkowski and Meier, 2010; Shariff and Tracy, 2011; Molho et al., 2017). In all, we expect women (more than men) to interpret same- gender expressions of disgust (but not anger) as cuing expresser desires to exclude them (but not physically harm them).

2.1 Method

2.1.1 Participants

We recruited 232 U.S. adult participants via CloudResearch (134 female, 86 male, 12 missing; M_{age} = 43.96, SD_{age} = 13.45; 83.9% White, 5.5% Black or African American, <5% other races/ethnicities) (Litman et al., 2017). All participants completing dependent variables were included in analyses, yielding 0.80 power to detect small effects (f = 0.08) assuming 0.5 correlation among repeated measures, done via G*Power (Faul et al., 2007).

2.1.2 Procedure and design

Adapting from previous pilot studies, participants imagined themselves at a social event where they met a same- gender person they thought seemed interesting ["*You're hanging out with a group of friends. Your closer friends are there, but so are a few other people whom you don't know too well yet. Everyone is having a pretty good time. You start chatting with a girl (guy) you don't know too well, but you like her (his) style…*"]. The vignette continues that, while chatting one-on-one with the person (in the context of the larger social gathering), participants looked down for a moment, and

when they looked up, they caught a flash of an emotional expression on the person's face. Thus, it was ambiguous as to what caused the facial expression and whether the facial expression was directed at the participant versus, for example, someone else at the event. Validated facial expressions were depicted via photographs from the NimStim photoset (Tottenham et al., 2009). In counterbalanced fashion, participants saw an expression of disgust or anger from the same expresser, imagining that that was the look on their face.

After each scenario, participants responded to 17 statements about how they interpreted the event ["Based on the scenario above, and on the facial expression you saw her (him) making when you looked up, please rate your agreement with the following statements…"] on a 7-point Likert-type scale (1 = *Not at all*, 7 = *Very much*). Four statements assessed the interpretation that the expresser wanted social distance from the participant ["She (He) wants to avoid me," "She (He) wants to be my friend" [R], "She (He) doesn't want to be near me," "She (He)] doesn't want to be talking to me"). We created composite scores for perceived desire for social distance for both disgust and anger expressions (both α's = 0.84).

Two statements assessed the interpretation that the expresser wanted to physically harm the participant [e.g., "She (He) wants to hit me," "She (He) wants to physically harm me;" both α's $\geq$ 0.91]. We did not expect that people would endorse these strongly, but included them given the use of anger expressions and the clear link between anger and subsequent aggression. Other distractor statements assessed participants' interpretation of the expression [e.g., "She's (He) disgusted by me])—indicating that people accurately perceived disgust and anger expressions accordingly (see Supplementary Table S2)—and/or its direction [e.g., "She's (He) disgusted by something/someone else at the party"]. These statements and their Means (*SE*s) are reported in full in the Supplementary Tables S1, S2. Participants then completed common demographic questions.

2.2 Results

We conducted a 2 (Participant sex/gender) × 2 (Expression: Disgust, Anger) × 2 (Interpretation: Avoidance, Harm) mixed-factors ANOVA, which yielded significant main effects of Expression, $F_{(1,212)} = 584.30$, $p < 0.001$, $\eta_p^2 = 0.734$, and Interpretation, $F_{(1,212)} = 20.61$, $p < 0.001$, $\eta_p^2 = 0.089$, and interactions of Expression and Participant sex/gender, $F_{(1,212)} = 4.00$, $p = 0.047$, $\eta_p^2 = 0.019$, and Expression and Interpretation, $F_{(1,212)} = 37.19$, $p < 0.001$, $\eta_p^2 = 0.149$, all qualified by a three-way interaction, $F_{(1,212)} = 17.51$, $p < 0.001$, $\eta_p^2 = 0.076$.

As predicted, compared to men, women were more likely to interpret same-gender disgust expressions as meaning that the expresser intends to exclude them, $F_{(1,212)} = 17.75$, $p < 0.001$, $\eta_p^2 = 0.077$, 95% CI = (0.41, 1.14). See Table 1 for means (SEs). There were no other differences between female and male participants (*p*s > 0.495). Additionally, both women and men interpreted disgust expressions as cuing greater exclusionary intent than anger expressions: women, $F_{(1,212)} = 490.16$, $p < 0.001$, $\eta_p^2 = 0.698$, 95% CI = (2.77, 3.31), and men, $F_{(1,212)} = 156.41$, $p < 0.001$, $\eta_p^2 = 0.425$, 95% CI = (1.80, 2.47).

3 Experiment 2

We test the prediction that—because (a) social exclusion *hurts* (e.g., Eisenberger et al., 2003), and (b) women are more likely than men to interpret same-gender facial expressions of disgust as cuing expresser intent to exclude them (Experiment 1)—women (vs. men) would report greater hurt in reaction to other women's disgust expressions. To further test the specificity of this prediction, participants now responded to either a male or female disgust expresser.

3.1 Methods

3.1.1 Participants

Of 418 U.S. adults from CloudResearch beginning the survey, 399 (231 female, 168 male; $M_{age} = 40.38$, $SD_{age} = 12.11$; 76.9% White, 8% Black or African American, 6.9% Asian or Asian American, <5% other races/ethnicities) passed bot and attention checks and were included in analyses, yielding 0.80 power to detect smaller effects ($f = 0.14$).

3.1.2 Procedure and design

Participants were asked to read the same general scenario as in Experiment 1—being at a larger social gathering where they are talking to an interesting person one-on-one. Whereas, in Experiment 1, participants were asked to imagine both disgust and anger expressions coming from a same same-gender expresser, here all participants imagined interacting with either a man or woman who flashed a disgust expression. To increase the generalizability of findings and mitigate concerns about stimulus effects (a) we used two photos of women and two photos of women making validated disgust expressions—with participants randomly assigned to see only one of these photos—and we took these photos from a second photo set—the Karolinska Directed Emotional Faces (KDEF) set (Lundqvist et al., 1998)—complementing other experiments using the NimStim photo set (Tottenham et al., 2009).

Participants were asked, "How do you feel, based on what happened?," and they reported the extent to which they felt six emotional reactions—hurt, sad, angry, afraid, proud, joyful—on 100-point sliders (0 = *Not at all*, 100 = *Extremely*), presented in random order. We predicted that women would report greater hurt than men when encountering women expressers—and that this pattern would be specific to reported hurt (vs. certain other emotional reactions). However, we did not have specific predictions about other emotional reactions. We chose other reactions in part based on what the widest range of participants would comprehend and to avoid having only negative emotions included. Finally, participants completed common demographic questions.

3.2 Results

To examine whether women's emotional reactions differed from men's reactions across the six measured emotions in response to women's or men's disgust expressions, we nested the six emotions

TABLE 1 Perceptions of exclusionary and harm intent elicited by disgust and anger expressions from experiment 1.

	Exclusionary intent		Harm intent	
	Women	Men	Women	Men
Disgust expressions	5.17 (0.12)	4.39 (0.14)	2.13 (0.12)	4.85 (0.15)
Anger expressions	4.78 (0.12)	2.26 (0.14)	3.07 (0.15)	2.96(0.19)

SEs are reported in parentheses. Responses were measured on a 7-point scale.

within individuals and used linear mixed modeling (using the MIXED model function in SPSS 28) to regress within-person levels of each emotional reaction onto Participant sex/gender and Expresser gender (both dummy coded: women = 0, men = 1) as well as a categorical variable for Emotion that we included as a fixed effect. In this model, we allowed the categorical fixed-factor variable for Emotion to interact with both Participant sex/gender and Expresser gender, and we entered the additional two-way Participant sex/gender × Expresser gender and three-way Emotion × Participant sex/gender × Expresser gender interactions. Finally, we allowed the intercept to vary randomly across participants, and we specified a variance components covariance structure. This linear mixed modeling approach allowed us to simultaneously estimate all within-person associations for each emotional expression in a single model, reducing the likelihood of making a Type I error. Results revealed that the three-way interaction emerged as significant, $F_{(5,1950)} = 2.28$, $p = 0.045$ (see the Supplementary Table S3 for results from the full linear mixed model).

To determine the simple effects for the significant three-way interaction, we next re-estimated the previous model but (a) suppressed the intercept to produce separate but simultaneous intercepts for each combination of emotion and expresser and participant sex and (b) allowed those intercepts to vary randomly across participants. We next used the TEST subcommand to create custom hypothesis tests specifying the simple effects. See Table 2 for results (means and *SE*s) from this model. In line with predictions, compared to men, women reported greater hurt in reaction to disgust expressions on women's faces, $t_{(1842.61)} = 3.39$, $p < 0.001$, $\eta_p^2 = 0.017$, 95% CI = (4.92, 18.43) (see Figure 1). There were no participant sex/gender differences for reported hurt in reaction to disgust expressions on men's faces ($p = 0.979$). Additionally, women reported much greater hurt in reaction to disgust expressions from women than men expressers, $t_{(1842.61)} = 4.76$, $p < 0.001$, 95% CI = (8.81, 21.16), whereas men reported similar levels of hurt in reaction to disgust expressions from women or from men expressers ($p = 0.357$). The sex/gender difference in reaction to disgust expressions on women's faces did not extend to anger ($p = 0.160$), pride ($p = 0.458$), joy ($p = 0.599$), sadness ($p = 0.383$), or fearfulness ($p = 0.924$).

4 Experiment 3

Experiment 3 examines these same predictions in recalled reactions to real-world instances of encountering disgust expressions. This mitigates concerns that affective forecasting errors caused the pattern of predicted results from Experiment 2, which used a hypothetical scenario (Wilson and Gilbert, 2003). Experiment 3 additionally explores possible participant sex/gender differences in the (a) ease and (b) frequency of recalling such instances, ensuring that, should we find the predicted sex/gender difference in reported hurt, this would not solely be due to biases in participants' ability to remember these events or different base rates in experiencing them. We note, however, that recalled frequency can perhaps be especially prone to recall issues (e.g., memory distortion, socially desirable responding).

4.1 Method

4.1.1 Participants

Ninety-nine U.S. adult MTurk participants (52 female, 46 male, 1 missing; $M_{age} = 35.86$, $SD_{age} = 11.80$; 59.6% White, 9.1% Black or African American, 9.1% Asian or Asian American, 8.1% Hispanic, Hispanic American, or Latinx, <5% other races/ethnicities) began the survey, and all who filled out sex/gender information and focal dependent variables were included in our analyses, yielding 0.95 power to detect small effects ($f = 0.09$). Data came from MTurk rather than CloudResearch because this study was conducted prior to our lab's reliance on the latter.

4.1.2 Procedure, materials, and measures

Participants were asked to recall times when a same-sex/gender person—one whom they did not already know well—expressed disgust and another time when a same-sex/gender person expressed anger at them, in random order. To ensure all participants recalled the correct expressions, we gave two photographic examples for each expression. One example came from the NimStim photoset (Tottenham et al., 2009), and the other was a modified version of another NimStim photograph of the same expression but morphed with a neutral expression (made by the same actor) to convey a more subtle emotional expression (40% disgust or anger expressivity) (Marneweck et al., 2013). We included this latter example because, in everyday life, emotions are expressed with graded intensity; thus, participants might have faced difficulty recalling instances when unknown others looked at them with full-blown (100%) negative emotionality.

After recalling the relevant instance, participants were asked to rate how *hurt*, *angry*, *sad*, *happy*, *proud, and fearful* they were in reaction to the expressivity, using a 9-point Likert-type scale (1 = *Not at all*; 9 = *Extremely*). Emotional reaction items appeared in randomized order. We report focal results (hurt) below. See Supplementary Table S3 for means (SEs) for all other emotional reactions.

TABLE 2 Reported hurt, anger, pride, and joy following a disgust expression from a woman or man expresser from experiment 2.

	Woman expresser		Man expresser	
	Woman participant	Man participant	Woman participant	Man participant
Hurt	44.32 (2.23)	32.65 (2.62)	29.34 (2.23)	29.25 (2.59)
Anger	28.57 (2.23)	23.73 (2.62)	31.03 (2.23)	18.95 (2.59)
Pride	6.80 (2.23)	9.35 (2.62)	6.52 (2.23)	6.13 (2.59)
Joy	7.34 (2.23)	9.55 (2.62)	7.57 (2.23)	9.17 (2.59)
Sad	28.90 (2.23)	25.90 (2.62)	20.95 (2.23)	20.51 (2.59)
Afraid	14.94 (2.23)	15.27 (2.62)	18.19 (2.23)	16.51 (2.59)

SEs are reported in parentheses. Responses were measured on a 100-point scale.

FIGURE 1
Reported hurt in reaction to women's vs. men's disgust expressions from experiment 2. Error bars reflect standard errors. The *y*-axis reflects the 100-point scale participants used to report hurt.

We additionally asked participants: how easy it was to recall these situations (*subjective ease of recall*) using a 7-point Likert-type scale (1 = *Not at all easy*; 7 = *Very easy*); how frequently they experienced instances wherein such same-sex/gender others looked at them with disgust or anger (*frequency of experience*) using a 7-point Likert-type scale (1 = *Not at frequently*; 7 = *Very frequently*). Women and men had similar subjective ease of recall and did not report differences in frequency of experiencing disgust expressions. See Supplementary material for detailed results. Participants completed demographic questions and exploratory individual difference items (e.g., intrasexual competitiveness; Buunk and Fisher, 2009).

4.2 Results

A 2 (Participant sex/gender) ×2 (Recalled expression) ANOVA yielded significant main effects of Participant sex/gender, $F_{(1,89)} = 12.00$, $p < 0.001$, $\eta_p^2 = 0.119$ and Recalled expression, $F_{(1,89)} = 5.96$, $p = 0.017$, $\eta_p^2 = 0.063$. The interaction was not statistically significant ($p = 0.058$).

In line with predictions made explicitly about simple effects, women recalled greater hurt in reaction to same-sex/gender disgust expressions than men, $F_{(1,89)} = 14.42$, $p < 0.001$, $\eta_p^2 = 0.139$, 95% CI = (0.92, 2.93). See Table 3 for means (SEs). Women (but not men, $p = 0.720$) also recalled greater hurt in reaction to disgust than to anger expressions, $F_{(1,89)} = 10.06$, $p = 0.002$, $\eta_p^2 = 0.102$, 95% CI = (0.44, 1.90).

TABLE 3 Recalled hurt in reaction to experiencing same-sex/gender disgust and anger directed at oneself from experiment 3.

	Women	Men
Disgust	5.25 (0.35)	3.33 (0.37)
Anger	4.08 (0.32)	3.19 (0.34)

SEs are reported in parentheses. Responses were measured on a 9-point scale.

5 Experiment 4

If the women (more than men) use and interpret same-sex/gender others' facial expressions of disgust to convey desires to exclude, then those women who are more dispositionally concerned with being excluded should report greater hurt in reaction to other women's disgust expressions. Experiment 4 tests this.

5.1 Methods

5.1.1 Participants

Of 292 U.S. CloudResearch participants beginning the survey, 270 (145 female, 125 male; $M_{age} = 39.29$, $SD_{age} = 11.85$; 74.8% White, 7% Black or African American, 7% Asian or Asian American, <5% other races/ethnicities) reported male or female sex/gender, passed both attention checks, and were included in analyses. A sensitivity analysis suggests this yielded 0.80 power to detect small effects ($f^2 = 0.03$).

5.1.2 Procedure and design

Participants read the same scenario from Experiments 1 and 2, but all participants read about a woman expressing disgust. Participants reported affective reactions on 9-point scales (1 = *Not at all*, 9 = *Extremely*) and completed individual difference and demographic measures.

Directly following these reports, we assessed the individual difference measures eyed as potential moderators.[1] We measured dispositional concerns with social exclusion via the Need to Belong (NTB) scale, using its 10 items (e.g., "If other people don't seem to accept me, I don't let it bother me"; $\alpha = 0.86$) on a 5-point Likert-type scale (1 = *Strongly disagree*, 5 = *Strongly agree*) (Leary et al., 2013). We also assessed vulnerability to infectious disease via the Perceived Vulnerability to Disease (PVD) scale,[2] using its 16 items (e.g., "I avoid using public restrooms because of the risk that I may catch something from the previous user"; $\alpha = 0.81$) on a 5-point Likert-type scale (1 = *Strongly disagree*, 5 = *Strongly agree*) (Duncan et al., 2009).[3]

5.2 Results

We regressed reported hurt onto Participant s = Sex/gender (dummy coded; female = 0, male = 1), NTB (centered), PVD (centered), and the two Sex/Gender × Individual difference interaction terms. See Table 4 for results. In line with predictions, this yielded significant effects of Sex, such that women (vs. men) reported greater hurt in reaction to disgust expressions, and of NTB, such that greater NTB predicted greater hurt reported by women (but not men, $p = 0.687$).

We additionally found a significant Sex/Gender × NTB interaction (see Figure 2). Exploring the simple slopes revealed that, among participants higher in NTB (+1 *SD*), women reported greater hurt than men, $b = -1.80$, $t_{(259)} = -4.19$, $p < 0.001$, 95% CI = (−2.64, −0.95). Among those lower in NTB (−1 *SD*), this difference was not significant ($p = 0.980$).

6 Discussion

Insofar as women use some distinct tactics of intrasexual aggression—here, facial expressions of disgust to communicate one's exclusionary intent toward the target—then women recurrently face some distinct tactics of intrasexual aggression (i.e., these same expressions). Women might thus possess distinct interpretations of and as well reactions to these tactics. Data from four experiments supported predictions that, compared to men, women are more likely to (1) interpret expressions of disgust on same-sex/gender others' faces as connoting expresser intent to exclude and (2) report greater hurt in reaction to these expressions on women (but not men) expressers, whether imagined from hypothetical scenarios or recalled reactions to real-world events. This was not the same pattern of results for expressions of anger, despite anger being associated with impending aggression. Further (3) women (but not men) who are more dispositionally concerned with being socially excluded reported even greater hurt in reaction to other women's disgust expressivity.

Findings are consistent with the proposition that, insofar as women sometimes confront distinct social challenges, women might possess distinct social cognitive and behavioral repertoires for navigating them. Just as a survey of the archaeological record would suggest that warriors' shields often reflect good design to guard against the literal slings and arrows they recurrently faced, women's social cognition might be similarly well-designed to manage the figurative slings and arrows they recurrently face. Broadly, then, this work suggests value in (a) identifying the sometimes-distinct and often-overlooked affordances that women confront in their interactions with other women and (b) exploring how women manage these opportunities and threats.

6.1 Limitations and future directions

One might wonder why men failed to interpret and react to disgust expressions as women did. We would certainly not argue that boys and men are wholly insensitive to detecting or reacting to cues of impending exclusion. Rather, we raise two possibilities. First, it is possible that at least intrasexual social exclusion is more frequent and/or consequential among women (e.g., Benenson, 2013, 2014), leading women to be more likely to err on the side of inferring that other women mean to exclude them (Haselton and Buss, 2000). Second, men (vs. women) may be more likely to face comparatively overt tactics of exclusion (e.g., shoving, yells of "We don't want you here!"). If male actors use more overt cues of impending exclusion, then male targets might not need to be so attuned to such subtler ones. If these expressions are not cues of exclusion among men, then men have no need to interpret and react to them as such. Indeed, others have asserted that non-verbal expressions of exclusion may very well "have special meanings for girls" and women (see also, Brown and Gilligan, 1993; Reader, 1999; LaFrance, 2002; Underwood, 2004). If this second possibility is correct, perhaps men would react similarly as women did here to those more overt cues of impending exclusion. One might also explore how various fundamental social motivations (Kenrick et al.,

1 We note that we cannot rule out demand characteristics here. Whereas we hypothesize that women who have higher dispositional exclusion concerns would react the most strongly to potential cues of impending exclusion (i.e., other women's disgust expressions), it remains possible that women (but not men) who reported the greatest hurt could have intuited experimenter aims and thus reported higher need to belong (but not different perceived vulnerability to disease).

2 As an ancillary test, we used PVD to explore a plausible alternative for women's greater sensitivity to disgust expressions: women have a lower disgust threshold than men (Tybur et al., 2009; Lieberman et al., 2012). Such work might imply that factors such as women's greater dispositional concerns about vulnerability to disease influence and perhaps even drive women's greater reactivity to disgust expressions. This account cannot necessarily explain the specificity of the effects seen here—that women report specifically greater hurt in reaction to other women's (but not men's) disgust expressions. In retrospect, perhaps other measures of disease concern would have been more appropriate (see, e.g., Neel et al., 2016).

3 In the Supplementary material, we explore whether there are sex/gender differences in these individual differences.

TABLE 4 Associations between participant sex/gender, need to belong (NTB), perceived vulnerability to disease (PVD), and reported hurt in reaction to women's disgust expressions from experiment 4.

	b	*SE*	*t*	*p*	95% CI
Intercept	5.34	0.20	——	——	(5.04, 5.83)
Sex/Gender	−0.89	0.30	3.03	0.003	(−1.48, −0.31)
NTB	1.07	0.25	4.35	< 0.001	(0.58, 1.55)
PVD	−0.29	0.35	−0.83	0.408	(−0.97, 0.40)
Sex/Gender × NTB	−1.19	0.39	−3.05	0.003	(−1.96, −0.42)
Sex/Gender × PVD	0.96	0.53	1.81	0.071	(−0.08, 2.01)

df = 259. Participant sex/gender is coded such that 0 = Women, 1 = Men. Responses were measured on a 9-point scale.

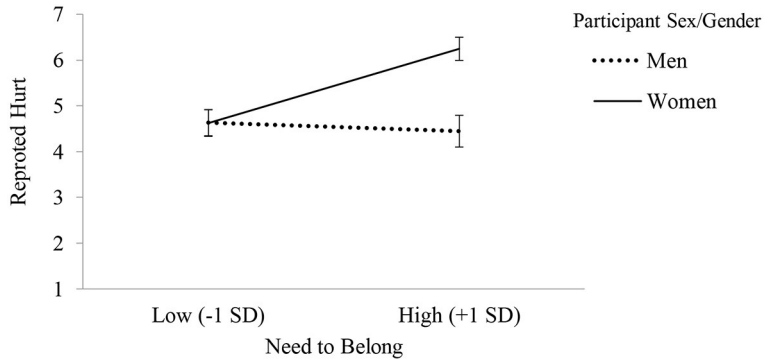

FIGURE 2
Reported hurt in reaction to women's disgust expressions as a function of need to belong from experiment 4. Error bars reflect standard errors. The *y*-axis reflects the 9-point scale participants used to report hurt.

2010; Cook et al., 2021), such as strong desires to affiliate, might affect men and women's reactions to cues perceived as exclusionary.

The present work does not address why women and men sometimes differently enact intrasexual social exclusion in the first place. Some have reasoned that perpetrating physical aggression or other tactics that evoke physical retaliation might be costlier for women and/or that women's indirect tactics are especially well-tailored to harm other women (e.g., Bjorkqvist et al., 1994; Campbell, 2002; Benenson et al., 2013). On this view, perhaps women's disgust expressions facilitate the exclusion of disfavored others while also allowing expressers some plausible deniability of aggressive intent, attenuating the likelihood that aggressor-expressers face retaliation from targets and their allies. On this view, expressions of disgust among women might be an *implicature*—inferred content from a communication (Sperber and Wilson, 1998)—as is indirect speech (e.g., "Officer, is there a way we can make this ticket go away?"; Pinker et al., 2008). For example, compared to bald propositions, such insinuations allow speakers to enjoy the greatest possible benefits (e.g., getting out of the ticket) without facing the full possible costs (e.g., getting arrested for attempted bribery). Here, women expressers might enjoy the benefits of excluding same-sex/gender others without risking the costs of being deemed an overt aggressor by targets, their allies, and other would-be third-party punishers.

This raises the question of whether third parties—notably, men—recognize what one woman's look of disgust toward another can mean. Indeed, the potentially encrypted nature of this message—primarily made by and for women—could imply not only that women expressers are unlikely to get tagged as aggressors by (male) onlookers, but also that women targets might be less believed and supported by (male) allies. Future work should examine the extent to which women's tactics of aggression allow them to avoid retaliation from targets as well as from others (e.g., targets' allies, audiences of gossip)—and the extent to which this differs by sex/gender.

The present work used U.S. community samples, in large part because the work detailing women's disgust expression use was primarily conducted in the U.S. However, women seem to eschew physical tactics of aggression across cultures, especially when aggressing against other women (Burbank, 1987). To the extent that women across cultures use non-physical tactics, then women across cultures might possess distinct interpretations of and reaction to such cues—be they facial expressions of disgust or others. Future work might seek to identify culturally distinct male- and female-typical tactics of aggression to explore the broader hypothesis that people are attuned to that tactics of aggression that they recurrently face. One might also wish to explore how factors even within nations, such as ecology and race in Western nations (Campbell, 2002; Williams et al., 2016), might shape the intrasexual aggression that women experience, and thus their reactivity. For example, faces used here appeared White; given racialized perceptions of emotion in the U.S. (e.g., Becker et al., 2010), future work might examine the role of race.

Although data in each studied largely supported a priori predictions, we note that some studies did not employ attention or bot checks, whereas others did (as explicitly noted in the respective "Methods" sections). Note that the inclusion of inattentive participants would likely work against our ability to find a signal through the noise.

Universally, disgust expressions are made in response to potentially noxious stimuli, with social perceivers recognizing and often benefitting from what others' disgust connotes (Shariff and Tracy, 2011). The present work suggests that such disgust expressions might also have *social* functionality (e.g., Kupfer and Giner-Sorolla, 2017)—and not just in dyadic situations, wherein, say, Akeelah's disgust at Betty connotes Akeelah's desire to avoid Betty—but also in triadic and *n*-person situations. Consider, for example, Akeelah and her friend Carla are chatting when Carla catches sight of Dee, a woman she finds distasteful and wants to avoid. In such a context, Carla's disgust face "at" Akeelah would be read by Akeelah as connoting *not* Carla's desire for distance from Akeelah, but rather Carla's desire for both her *and* Akeelah to maintain their social distance *from* Dee. This illustration is consistent with the notion that, just as people's internal feelings of disgust help them maintain safe distances from potentially noxious *objects*, interpersonal disgust expressions might help people and groups maintain "safe" distances from socially undesirable *people*. Perhaps this is why the 2015 Pixar film "Inside Out" introduced its anthropomorphized Disgust character as the being responsible for keeping the 11-year-old girl she inhabited "from being poisoned—physically and socially" (Rivera and Docter, 2015).

6.2 Conclusion

Women's and men's tactics of intrasexual aggression sometimes diverge. We reasoned that women targets of intrasexual aggression would be uniquely attuned to recognizing and reacting to the tactics that they uniquely and recurrently face. We found evidence for this proposition with respect to facial expressions of disgust, a tactic of indirect aggression—and specifically of social exclusion—more likely among women (Underwood, 2004): More than men, (1) women participants interpreted other women's disgust expressions as cuing expresser intent to exclude them, and—as such exclusion hurts (Eisenberger et al., 2003)—(2) reported greater hurt in reaction. (3) Further, women more dispositionally concerned with social inclusion reported greater hurt in reaction to other women's disgust expressions. Together, these data suggest value in examining women's responses to the somewhat distinct tactics of aggression they recurrently face, particularly in the context of their same-sex/gender social ecologies.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found at: OSF: https://osf.io/4hbkp/?view_only=0cc0eee1dce847adb4dbd65ad7b61030.

Ethics statement

The studies involving humans were approved by Institutional Review Board of the Oklahoma State University. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

JK: Conceptualization, Data curation, Funding acquisition, Methodology, Project administration, Resources, Supervision, Writing – original draft, Writing – review & editing. JF: Data curation, Formal analysis, Validation, Visualization, Writing – review & editing. GF-C: Conceptualization, Writing – review & editing.

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Conflict of interest

GF-C was employed by the Social Policy Research Associates.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/frsps.2024.1335368/full#supplementary-material

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