Choking Under Social Pressure: Social Monitoring Among the Lonely

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Abstract

Lonely individuals may decode social cues well but have difficulty putting such skills to use precisely when they need them—in social situations. In four studies, we examined whether lonely people choke under social pressure by asking participants to complete social sensitivity tasks framed as diagnostic of social skills or nonsocial skills. Across studies, lonely participants performed worse than nonlonely participants on social sensitivity tasks framed as tests of social aptitude, but they performed just as well or better than the nonlonely when the same tasks were framed as tests of academic aptitude. Mediational analyses in Study 3 and misattribution effects in Study 4 indicate that anxiety plays an important role in this choking effect. This research suggests that lonely individuals may not need to acquire social skills to escape loneliness; instead, they must learn to cope with performance anxiety in interpersonal interactions.

Keywords

loneliness, interpersonal sensitivity, choking under pressure, anxiety, task framing

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Many people struggle with loneliness. The average American feels lonely 1.5 days per week, and 4.2% of Americans feel lonely every day, according to the 1996 General Social Survey (Smith, Marsden, Hout, & Kim, 2013). The costs are substantial. Loneliness is associated with negative mood and depression (e.g., Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006; Wei, Russell, & Zakalik, 2005), cognitive decline in old age (Wilson et al., 2007), poor sleep and sleep disorders (e.g., Zawadzki, Graham, & Gerin, 2013), poor immune functioning (e.g., Pressman et al., 2005), cardiovascular disease (e.g., Lynch, 1979), and shorter life spans (e.g., House, Landis, & Umberson, 1988).

Most lonely people would like to escape loneliness by establishing more social connections but often seem unable to do so (Cacioppo & Patrick, 2009). The present investigation sought to test one process that may thwart their efforts to connect. Specifically, we hypothesized that the desire to form relationships, combined with anxiety about one's ability to do so, may create a daunting sort of performance pressure that causes lonely people to do badly at social tasks such as reading others' emotions. That is, lonely people may experience interpersonal difficulties because they choke under pressure when called on to use social skills.

Maintaining Loneliness

Psychologists have conceptualized loneliness as an aversive state characterized by feelings of social isolation or impoverished relationships (e.g., Russell, Peplau, & Cutrona, 1980; Weiss, 1973). These feelings of loneliness may come about for a variety of reasons. Obviously, experiences of rejection or social loss can bring about situational feelings of loneliness (see Ernst & Cacioppo, 1999, for a review). But such experiences and circumstances do not befall one randomly, like being hit by a meteorite. More likely, lonely people do some things that make them lonely and perpetuate their loneliness. Understanding some ways in which lonely people are authors of their own misfortunes holds promise of showing how some people might be able to reduce their suffering by changing their behaviors.

Consistent with that optimistic note, a recent meta-analysis confirmed that multiple therapeutic interventions have had modest success at reducing loneliness (Masi, Chen, Hawkley, & Cacioppo, 2011). Lonely people appear hampered by negative thoughts and feelings, including being more pessimistic (e.g., Ernst & Cacioppo, 1999), less trusting (Rotenberg et al., 2010), and more anxiously attached

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(Wei et al., 2005) than nonlonely people. Interventions such as cognitive-behavioral therapy, which focuses on changing such cognitions, have fared best in methodologically rigorous studies (Masi et al., 2011). Arguably, future interventions focusing on reducing lonely individuals' elevated levels of anxiety and fear of negative evaluation (Cacioppo & Hawkley, 2009) might be effective as well.

Alongside cognitive and emotional troubles, deficient social skills have been suggested as contributing to the maintenance of loneliness. In comparison with nonlonely people, chronically lonely people appear to be less sociable (Horowitz & de Sales French, 1979), less expressive (Gerson & Perlman, 1979), less emotionally intelligent (Zysberg, 2012; see also Qualter, Quinton, Wagner, & Brown, 2009), less willing to self-disclose (W. H. Jones, Carpenter, & Quintana, 1985; Wei et al., 2005; cf. Stokes, 1985), less emotionally supportive (Buhrmester, Furman, Wittenberg, & Reis, 1988), and less attentive to conversation partners (W. H. Jones, Hobbs, & Hockenbury, 1982). These deficits may lead lonely individuals to be perceived more negatively than nonlonely individuals (Tsai & Reis, 2009).

Contrary to the picture of lonely people as antisocial or socially deficient, Gardner, Pickett, Jefferis, and Knowles (2005) showed that the lonely engage in more social monitoring than nonlonely people. Specifically, loneliness predicted incidental social memory, and lack of friends predicted more accurate decoding of facial expressions. Similar findings characterize people with unusually high motivation to belong. For example, Gardner, Pickett, and Brewer (2000) found that excluded individuals (who may be assumed to desire social connection) spontaneously attended to social information more than others. Pickett, Gardner, and Knowles (2004) found that both acute and chronic belonging deficits engage the social monitoring system. In comparison with individuals with neither chronic nor acute belonging deficits, those who had just been rejected and those who reported chronically heightened belongingness needs demonstrated greater accuracy in recognizing facial expressions and vocal tones. Thus, lonely people are highly skilled at social monitoring in a laboratory environment; they even outperform the nonlonely in some cases.

If the lonely are eagerly monitoring social cues more than the nonlonely, why do they fail to connect with others and lessen their feelings of isolation? Because experimental manipulations can eradicate purported social skills deficits among the lonely, Vitkus and Horowitz (1987) argued that lonely individuals have sufficient skills to succeed in social situations. They suggested that anxiety and passivity inhibit social performance among the lonely. Coupled with studies of social monitoring, this research suggests that loneliness is not perpetuated by social skills deficits.

But social skills do not necessarily translate into social success. Perhaps lonely people have adequate skills but these sometimes fail. The next section will invoke one established model for the occasional failure of skill.

Choking Under Pressure

The popular expression that someone chokes under pressure has been empirically validated. Baumeister (1984) defined choking as a paradoxical incentive effect, in that the person performs below capacity precisely in situations that called for superior performance. His work pointed to self-focused attention as a crucial mediator and moderator of choking. Seeking to do well, the performer pays extra attention to the internal process of performance—but because skill involves automatic and overlearned processes, conscious attention disrupts their smooth execution and makes the result unreliable, thus impairing performance (see also Kimble & Perlmuter, 1970). Specific examples include experts such as golfers (Beilock & Carr, 2001) and baseball batters (Gray, 2004) who perform worse on complex, proceduralized tasks when under pressure. These impairments appear to conform to Baumeister's characterization of choking as a matter of focusing excessive attention on the inner performance process, which interferes with the automaticity of skill (see also Gray, 2011).

Distraction has also been implicated as a cause of choking. Beilock and Carr (2005) have shown that pressures tax working memory and close attentional control. That is, worry or anxiety about failing can distract a person from performance-relevant cues and thereby impair performance. Test-anxious students perform badly because worries about failure intrude and distract them from answering the test questions (Bertrams, Englert, Dickhäuser, & Baumeister, 2013). Similarly, minority-group members might underperform on stereotype-relevant tasks because they are concerned about confirming negative stereotypes (Schmader & Johns, 2003) or failing to confirm positive ones (Cheryan & Bodenhausen, 2000).

Altogether, numerous studies demonstrate that individuals often underperform due to either distraction or explicit monitoring. DeCaro, Thomas, Albert, and Beilock (2011) concluded that performance pressure often elicits anxiety that distracts individuals carrying out tasks that rely on working memory and attentional control. Furthermore, they also argued that socially evaluative pressure (e.g., being watched) hinders performance on proceduralized tasks that do not require working memory or close attentional control (e.g., sensorimotor tasks). In such cases, individuals monitor task execution, and such explicit monitoring impairs performance. Thus, distraction and monitoring represent two routes to performance failure that could explain choking in a variety of situations. Social situations might create such pressures for lonely people and cause them to choke.

Overview of Present Investigation

We sought to show that lonely people choke under social pressure. We reasoned that lonely people do have social skills and can perform social tasks effectively when there is

no pressure. However, when interpersonal implications and contingencies are salient, lonely people's skills likely fail them, both because anxiety intrudes and distracts them from performing effectively, and because self-focused attention intrudes into the performance process and disrupts automatic skill execution. As a rival hypothesis, we examined motivation and effort; perhaps lonely people withdraw effort from social performances, consistent with a self-handicapping strategy (E. E. Jones & Berglas, 1978).

We conducted four studies to examine how lonely people perform under pressure on social monitoring tasks. Participants first reported the extent to which they felt lonely and completed a facial expression recognition task (Studies 1, 3, and 4) or a vocal recognition task (Study 2). These social monitoring tasks were framed in either a social way (as a social skill important for social success) or a nonsocial way (as a cognitive skill important for academic or career success). The moderating influence of acute social threats was examined in Study 3. The hypothesized role of anxiety was a particular focus of Study 4, which used a misattribution paradigm to make some participants attribute their physiological arousal to an irrelevant stimulus rather than to performance pressure. Based on the model of choking under pressure, the main predictions were that lonely people would perform well (comparable with or better than the nonlonely) on tasks framed in terms of nonsocial skills but would perform significantly worse on the same tests when these were framed in terms of social skills. Performing social monitoring tasks with salient social implications should elicit anxiety among the lonely, and attributing that anxiety to external factors should eliminate the tendency for lonely people to choke on such tasks.

For each study, our sample sizes were informed by previous social monitoring research using similar measures (Gardner et al., 2005; Pickett et al., 2004), although our final samples were limited by participant availability and natural breaks in the academic year (e.g., winter and summer breaks). Data collection concluded when our participant allocation was spent. Given our relatively small sample sizes (which were typical of other studies being run in the field at the time), we combined the results of all four studies using meta-analytic techniques.

Study 1

As an initial exploration of the choking effect among the lonely, Study 1 required individuals to report their loneliness and to complete a facial expression recognition task framed in either a social or nonsocial way. Given past research demonstrating better social monitoring among the lonely than the nonlonely (Gardner et al., 2005), we predicted that lonely individuals would perform as well as or better than nonlonely individuals on the nonsocially framed task. Conversely, the lonely should perform worse than the nonlonely on the socially framed task. That is, lonely individuals should choke under social pressure.

Method

Participants and design. After completing an unrelated study, 86 undergraduates (56 female) participated in our study in return for course credit or payment. Neither type of compensation nor participant gender influenced participants' performance (ts < 1.46, ps > .14) and will not be discussed further. The current study used a 2 (task framing: social vs. nonsocial) × Loneliness between-subjects design.

Procedure. All participants completed a pre-test measure of loneliness. Those participating during the summer completed a three-item loneliness measure over email. They reported from 1 (*never*) to 7 (*often*) the extent to which they felt left out, isolated from others, and lacking in companionship, three items borrowed from the UCLA (University of California, Los Angeles) Loneliness Scale, version 3 (Russell, 1996). Those participating during the academic year completed the 20-item Revised UCLA Loneliness Scale, version 2 (Russell et al., 1980) at an earlier mass-testing session. The scales used the same seven response options.

One to six weeks after pre-testing, participants took part in the experimental session in individual cubicles. Participants randomly assigned to the *social framing condition* were told,

> You should know that people who do well on this task tend to perform well in social situations every day, and tend to form strong, long-lasting relationships with other people throughout life. Unfortunately, people who do poorly on this task tend to perform quite badly in social interactions and have difficulty forming and maintaining meaningful relationships as they get older.

Conversely, participants in the *nonsocial framing condition* were told,

> You should know that people who do well on this task tend to perform well in problem-solving situations every day, and tend to excel in school and attain good jobs after graduation. Unfortunately, people who do poorly on this task tend to perform quite badly in daily problem-solving situations and have difficulty getting ahead in school and in their careers.

All participants then completed a slightly updated version of the Diagnostic Analysis of Nonverbal Accuracy (DANVA-2; Nowicki & Duke, 1994). In this task, 24 faces were shown individually on a computer screen, and participants had 2 s to label them as displaying anger, fear, happiness, or sadness. Half of these faces displayed high-intensity emotions and half displayed low-intensity emotions. Because of the relative ease with which individuals recognize high-intensity emotions, a ceiling effect often emerges. Consequently, as in previous research (e.g., Pickett et al., 2004), we examined accuracy in identifying only the low-intensity emotional expressions as well as accuracy in identifying the full set of stimuli. We expected performance on the low-intensity items

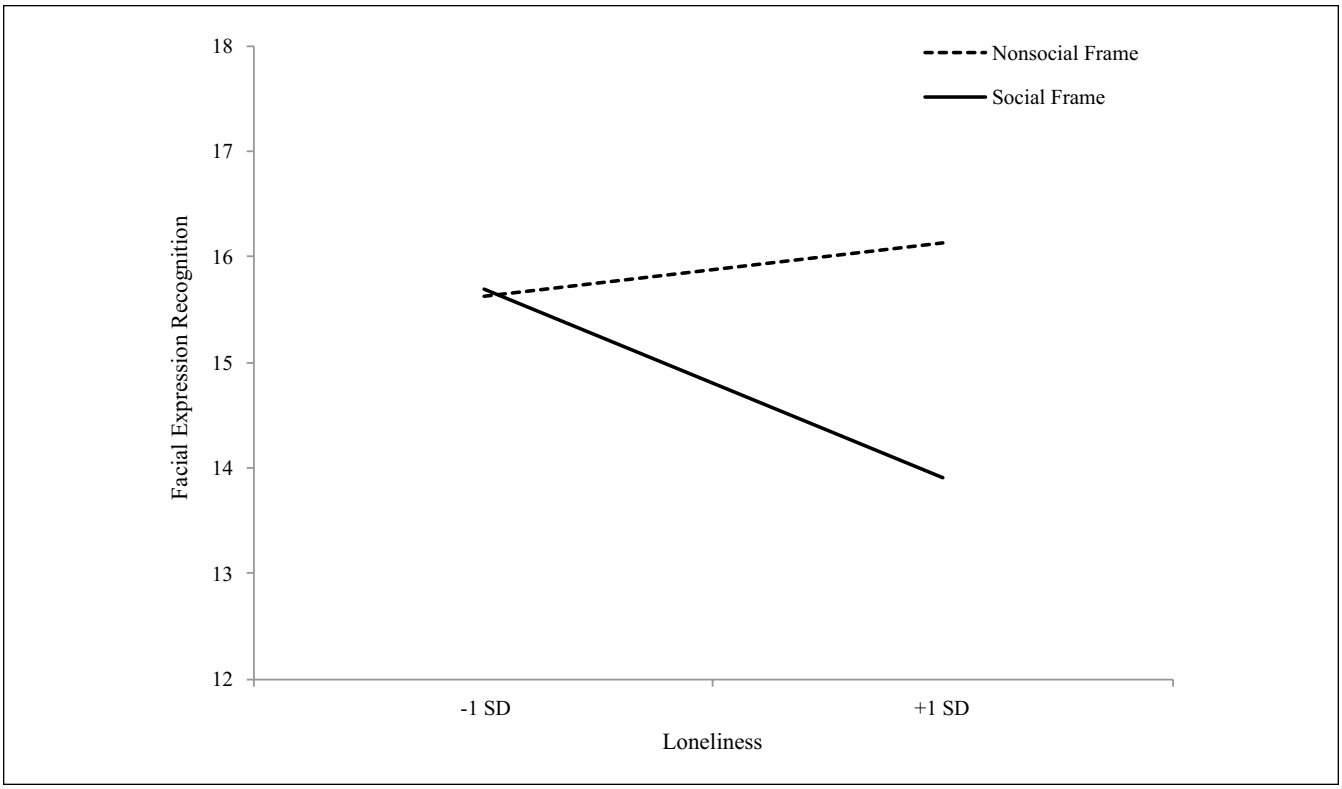

Figure 1. Facial expression recognition on the DANVA-2 as a function of participant loneliness and task framing (Study 1).
Note. DANVA = Diagnostic Analysis of Nonverbal Accuracy.

to serve as a more sensitive indicator of individuals' ability to recognize subtle social cues.

Results and Discussion

Five participants were excluded from subsequent analyses because they were familiar with the DANVA-2 from another study. Two additional participants were excluded for inattentiveness (e.g., looking away from the monitor and providing delayed responses).

Scores from the three-item loneliness measure (M = 3.33, SD = 1.30, α = .79) ranged from 1.33 to 5.67, and those from the R-UCLA Scale (M = 2.73, SD = 0.95, α = .93) ranged from 1.10 to 5.55. All loneliness scores were converted to z scores and used to predict accuracy in recognizing all of the expressions on the DANVA-2 (M = 15.41, SD = 2.49). Consistent with predictions, the multiple regression analysis yielded a significant Framing × Loneliness interaction, β = −.33, $t(75) = -2.11$, p = .04, 95% confidence interval [CI] = [−2.25, −.06], r = .24, displayed in Figure 1. Simple slope analyses indicated that loneliness was unrelated to performance on the nonsocially framed task, β = .10, $t(75) = 0.64$, p = .52, 95% CI = [−.52, 1.03], r = .07, but loneliness significantly predicted worse performance on the socially framed task, β = −.36, $t(75) = -2.34$, p = .02, 95% CI = [−1.68, −.13], r = .26. The latter finding suggests that lonely people choked under pressure. Indeed, when the task was framed in a social way, the least lonely participants outperformed the most lonely participants 16.34 expressions to 12.11.

Following the suggestions of Aiken and West (1991), we found that the framing manipulation had no impact on the performance of nonlonely persons (1 SD below the mean), β = .01, $t(75) = 0.09$, p = .93, 95% CI = [−1.47, 1.61], r = .01, but it had a significant impact among people 1 SD lonelier than the mean, β = −.44, $t(75) = -2.89$, p = .005, 95% CI = [−3.74, −0.69], r = .32. We also found the region of significance to be at values above .01—indicating that the social frame impeded the performance of participants at and above the mean loneliness score.

Because past research has focused on the subtler, low-intensity emotional expressions included in the DANVA-2 (e.g., Pickett et al., 2004), we ran additional analyses using only those expressions. Consistent with predictions, a marginal Framing × Loneliness interaction emerged, β = −.29, $t(75) = -1.80$, p = .076, 95% CI = [−1.46, 0.07], r = .20, with the least lonely participants outperforming the most lonely participants in the social framing condition 6.70 low-intensity expressions to 4.34. Subsequent simple slope analyses revealed no relationship between loneliness and performance in the nonsocial framing condition, β = .10, $t(75) = .69$, p = .49, 95% CI = [−0.36, 0.73], r = .08, and a marginal

relationship in the social framing condition, β = −.29, $t(75) = -1.86$, $p = .067$, 95% CI = [−1.05, 0.04], $r = .21$. Parallel analyses using only the high-intensity faces found no significant effects. These findings suggest that individuals' identification of the lower intensity expressions may be a more sensitive measure of nonverbal decoding than the high-intensity expressions. This is likely due to the relative ease of labeling high-intensity expressions.

Thus, Study 1 provided initial support for the hypothesis that lonely people perform badly when they think their social skills are being tested but do fine on the same test when they do not believe it measures their social skills.

Study 2

We conducted a second study to further examine this choking effect among lonely individuals. This study improves upon the former by using the same loneliness measure for all participants and assessing a second social sensitivity modality—vocal tone recognition. We predicted that lonely individuals would perform worse when the task was framed in a social rather than a nonsocial way.

Method

Participants and design. Eighty undergraduates (55 females) participated for partial course credit. The study used a 2 (task framing: social vs. nonsocial) × Loneliness between-subjects design.

Procedure. Upon arrival, participants completed the R-UCLA Loneliness Scale (Russell et al., 1980) on a scale ranging from 1 (*never*) to 4 (*often*). After some filler questionnaires, all participants completed a test of vocal tone recognition. Similar to Study 1, participants who were randomly assigned to the *social framing condition* were told,

> This test is used to assess how well individuals can pick up on and understand other people's thoughts and feelings. Because this well-validated and reliable index is positively associated with both short-term and long-term relationship well-being, it is very commonly used among relationship researchers.

Participants in the *nonsocial framing condition* were told,

> This test is used to assess how well individuals can pick up on and understand certain cues while ignoring other distractions. Because this well-validated and reliable index is positively associated with both short-term and long-term academic success, it is very commonly used among education researchers.

The test involved listening to 32 words, half of which were spoken in a positive tone of voice whereas the other half had a negative tone. Cross-cutting that difference, half of the words were positive (e.g., pretty) and half were negative (e.g., bitter). Participants were instructed to categorize each word according to the spoken tone while ignoring its meaning as quickly as possible without sacrificing accuracy (Kitayama & Ishii, 2002; Pickett et al., 2004). We anticipated this task being particularly difficult when the vocal tone and word meaning mismatched (on incongruent trials). Participants' responses and their response times were measured via Medialab software. Finally, participants were asked to report back the instructions to confirm their understanding.

Results and Discussion

Four participants were excluded from analyses because they reported categorizing the stimuli by word meaning rather than vocal tone, as instructed. Similarly, four additional participants were excluded because they reported not knowing the task was timed, and as a result, they took an unusually long time to complete the task (all having response times +2 *SD* greater than the mean). Another participant was eliminated because she lacked English proficiency, and a final participant was eliminated because she knew the purpose of the study.

Social monitoring performance was operationalized as the number of vocal tones correctly categorized ($M = 29.96$, $SD = 1.77$). We regressed performance on centered R-UCLA scores (range = 1.20-2.50, $M = 1.77$, $SD = 0.32$, α = .88) and framing condition (0 = nonsocial, 1 = social) in the first step of a hierarchical multiple regression and their interaction in the second step. Neither main effect was significant, but the interaction was a marginal predictor of performance, β = −.31, $t(66) = -1.75$, $p = .08$, 95% CI = [−4.98, 0.32], $r = .21$. Simple slope and simple effects analyses did not yield significant findings. Thus, the pattern shown in Figure 2 was the same as Study 1, but the effects were weaker with the least lonely participants outperforming their most lonely counterparts 30.56 to 29.25 in the social frame condition. The weaker effect may be due to the framing manipulation only mentioning good outcomes. In retrospect, lonely people may choke mainly when the negative aspects of social failure are made salient, but this speculation remains untested. In addition, the weaker effect could be due to the measure being less sensitive ($M = 29.96$, $SD = 1.77$, out of maximum 32), a hypothesis that can be tested by looking at participants' social monitoring scores more closely.

Because performance on incongruent trials ($M = 14.80$, $SD = 1.51$) was more variable than on the congruent trials ($M = 15.16$, $SD = 0.95$), we ran a set of exploratory analyses on the more sensitive, incongruent trials. This analysis yielded a significant Framing × Loneliness interaction, β = −.44, $t(66) = -2.56$, $p = .01$, 95% CI = [−5.02, −0.62], $r = .30$. Subsequent analyses revealed that loneliness predicted significantly better performance on the nonsocially framed incongruent trials, β = .39, $t(66) = 2.27$, $p = .03$, 95% CI = [0.22, 3.42], $r = .27$, but not the socially framed incongruent trials, β = −.21, $t(66) = -1.32$, $p = .19$, 95% CI = [−2.51, 0.51], $r = .16$. These findings suggest that lonely individuals

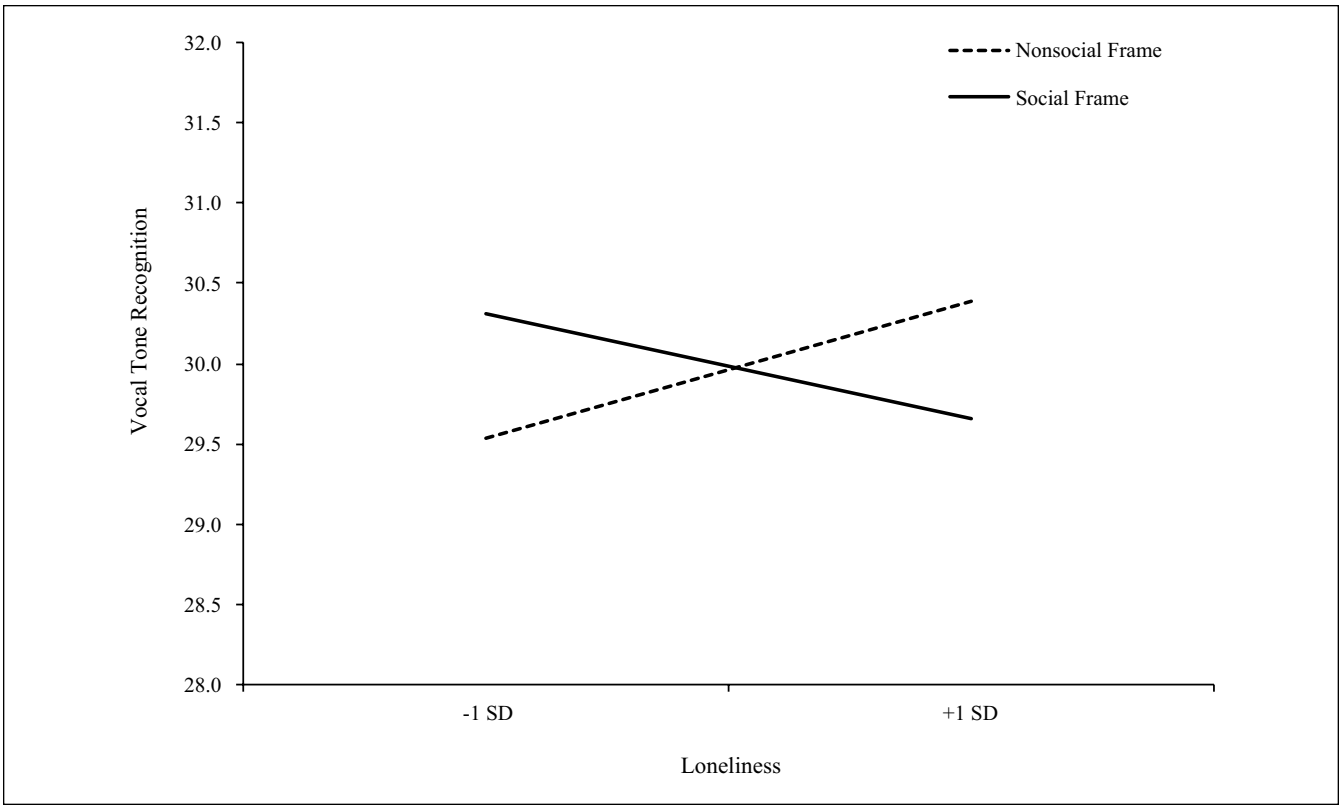

Figure 2. Vocal tone recognition as a function of participant loneliness and task framing (Study 2).

outperform the nonlonely on social monitoring tasks (Gardner et al., 2005), but this difference disappears when the social value of the tasks are made salient. Furthermore, in identifying regions of significance, we found that task framing significantly influenced performance on the incongruent trials at and beyond (centered) loneliness values of −.23 and .63 (where $SD = 0.32$). That is, nonlonely individuals (approximately two thirds of a standard deviation below the loneliness mean and lower) performed significantly better on the socially framed task than the nonsocially framed task. Conversely, very lonely individuals (about two standard deviations above the loneliness mean and higher) performed significantly worse on the socially framed task than the nonsocially framed task.

For exploratory purposes, we also examined whether task framing influenced the speed at which lonely individuals completed the vocal identification task. This analysis yielded no significant effects. Thus, lonely individuals' responses were neither hurried nor slowed under social framing conditions.

Study 3

Study 3 was designed, in part, to determine whether the choking effect is specific to social monitoring tasks or whether it is a more general effect that might be attributable to lonely individuals' lack of motivation to perform well on ostensibly social tasks. To get at this alternative explanation, we included a nonsocial anagram task that could be framed as socially relevant or irrelevant. We predicted that lonely individuals would perform more poorly on a social monitoring task framed in a social way than nonlonely individuals, but lonely and nonlonely individuals should perform equally well on an anagram task regardless of its framing. In addition to the nonsocial task, we included a set of questions to assess participants' motivation to perform well on the social monitoring task under both framing conditions. We also included questions assessing participants' performance expectations under both framing conditions.

Along with the questions about individuals' motivation to perform well on the tasks, we assessed another potential mediator, anxiety, by asking participants to report their feelings of anxiety while completing the social monitoring task. Given evidence for the role of anxiety in perpetuating loneliness, anxiety may more specifically interfere with the use of social skills. Thus, we expected anxiety levels to mirror performance on the social sensitivity task. That is, on the socially framed social monitoring task, as individuals' loneliness increases, their anxiety should increase and their performance should decrease.

Also in Study 3, we crossed the chronic belonging needs of the lonely with an acute social threat to examine the social

monitoring of the lonely under social threat. In light of previous research showing enhanced social monitoring after rejection (Pickett et al., 2004), we expected that individuals who experienced a social threat by reliving a past social rejection would outperform those in the control condition. We imagined two possible consequences of this manipulation on the purported choking effect. On one hand, an acute social threat may magnify the importance of one's social skills, and as a result, exacerbate the choking effect among the lonely. On the other hand, lonely individuals may attribute their anxiety to the reliving task rather than the social framed social monitoring task, thereby mitigating the choking effect.

Finally, this study also assessed individuals' ability to assess more complex emotional displays using only a portion of the face: the region around the eyes. We expected lonely individuals to outperform their nonlonely counterparts under normal conditions but choke when the social implications of the task were made salient.

Method

Participants and design. Ninety-three undergraduates (52 female) participated for course credit. The study used a 2 (reliving task: rejection vs. neutral) × 2 (task framing: social vs. nonsocial) × Loneliness between-subjects design.

Procedure. Upon arrival, participants completed several questionnaires (for another study) and also the R-UCLA Loneliness Scale using response options ranging from 0 (*never*) to 6 (*often*) (Russell et al., 1980). Next, participants were asked to recall a past experience, put themselves back in that place and time, and write about the event and its accompanying emotions in detail. Specifically, those in the *rejection condition* were told to relive an experience of intense rejection by an individual or group. Those in the *neutral condition* recounted their trip to campus and class that morning. We reasoned that reliving a rejection might exacerbate the choking effect among the lonely by magnifying the importance of one's social performance. Alternatively, lonely people might attribute the anxiety felt when completing the socially framed tasks to their previously relived rejection and would therefore actually perform better given their relief from performance-based anxiety.

After completing a reliving task, participants were told that the next two tasks would measure a similar construct despite seeming different. As in Study 1, those in the *social framing condition* were told that the tasks predicted social outcomes, whereas those in the *nonsocial framing condition* were told that performance predicted academic outcomes. The first task, the anagram task, consisted of 81 anagrams, and participants had 2 min to unscramble as many words as possible. The second task, the Eye Task, was a face-valid measure of social sensitivity in which 36 sets of eyes were displayed (the Reading the Mind in the Eyes Test from Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). The participant had to choose which of four emotional states (that varied by eye set) was displayed in the eyes (e.g., playful, comforting, irritated, bored). Participants had 2 min to label as many sets of eyes correctly as possible.

Finally, participants completed a questionnaire including measures of anxiety, motivation, performance expectations and estimates, and demographics. Borrowed from Mothersill, Dobson, and Neufeld (1986), the anxiety measure consisted of six items assessing participants' negative feelings and physiological responses.[1] Specifically, participants were prompted to consider how they were feeling when completing the Eyes Task and anagram task and respond to the items "I had an uneasy feeling," "I felt tense," "I felt anxious," "My heart beat faster," "I had a fluttering feeling in my stomach," and "I was perspiring" using response options ranging from 1 (*not at all true*) to 5 (*extremely true*). To gauge participants' motivation to perform well on the Eyes Test and anagram task, we included two sets of four questions. On a 1 (*not at all*) to 7 (*extremely*) scale, participants reported the extent to which they were motivated to do well, were engaged, were concerned about their performance, and thought it important to do well on the Eyes Test and the anagram task. To determine the extent to which lonely individuals had different performance expectations as a function of task framing, we asked participants how well they expected to do on the Eyes Task (or anagram task) on a scale from 1 (*not at all well*) to 7 (*extremely well*). Finally, to examine how well participants believed they performed on the Eye Task, we asked them to estimate their performance on a 100-point scale (%). Similarly, they were asked to estimate their accuracy in recognizing facial expressions in the real world using the same scale.

Results and Discussion

The data for one participant were dropped because he was given too much time on the Eyes Test. Five participants were excluded from data analysis because they did not complete the reliving task as instructed. Three final participants were eliminated because they either rushed through the tasks or acted erratically throughout the session.

Eyes Test. Loneliness scores ranging from .40 to 3.90 (M = 1.59, SD = 0.79) were centered, and reliving condition (neutral = 0, rejection = 1) and task framing condition (nonsocial = 0, social = 1) were dummy-coded prior to entering these variables in the first step of a hierarchical multiple regression equation predicting performance on the Eyes Test. All two-way interactions were added in a second step and the three-way interaction in a third step. As shown in Table 1, a marginal Loneliness × Framing interaction emerged, but it was qualified by a significant three-way interaction, $\beta = .55$, $t(76) = 2.08$, $p = .04$, 95% CI = [0.21, 9.42], $r = .23$. To unpack the three-way interaction displayed in Figure 3, we

Table 1. Results of Regression Analyses Examining Task Performance, Study 3.

Predicted variable, step, and predictor variable	*B*	β	*t*	*p*	95% CI
Eyes Test					
Step 1					
Loneliness	−0.32	−.07	−0.60	.55	[−1.39, 0.75]
Framing	1.12	.15	1.33	.19	[−0.56, 2.80]
Reliving task	1.20	.16	1.43	.16	[−0.47, 2.87]
Step 2					
Loneliness × Framing	−2.11	−.33	−1.87	.07	[−4.37, 0.14]
Loneliness × Reliving	0.05	.01	0.04	.97	[−2.21, 2.31]
Framing × Reliving	1.36	.14	0.79	.44	[−2.08, 4.80]
Step 3					
Loneliness × Framing × Reliving	4.81	.55	2.08	.04	[0.21, 9.42]
Anagram task					
Step 1					
Loneliness	−0.26	−.12	−1.07	.29	[−0.74, 0.23]
Framing	0.77	.22	2.00	.05	[0.00, 1.53]
Reliving task	0.15	.04	0.40	.69	[−0.61, 0.91]
Step 2					
Loneliness × Framing	0.37	.13	0.71	.48	[−0.68, 1.42]
Loneliness × Reliving	−0.31	−.09	−0.60	.55	[−1.36, 0.73]
Framing × Reliving	0.24	.06	0.30	.77	[−1.36, 1.83]
Step 3					
Loneliness × Framing × Reliving	0.07	.02	0.06	.95	[−2.13, 2.27]

Note. Analyses included dummy-coded variables for framing (0 = nonsocial, 1 = social) and reliving task conditions (0 = neutral, 1 = rejection). CI = confidence interval.

ran separate multiple regression analyses for the rejection reliving and neutral reliving conditions.

In the neutral condition, which resembled Studies 1 and 2, the interaction between loneliness and task framing was significant, β = −.58, $t(41) = -2.91$, $p = .006$, 95% CI = [−6.50, −1.12], $r = .41$. Simple slope analyses revealed that when the Eyes Test was framed as a test of social skills, higher loneliness led to worse performance, β = −.47, $t(41) = -2.31$, $p = .03$, 95% CI = [−4.07, −0.27], $r = .34$. Indeed, the least lonely participants outperformed the most lonely participants 15.86 accurately identified sets of eyes to 8.27. When the Eyes Test was framed as a test of academic competence, there was an opposite trend toward better performance by lonely participants, β = .36, $t(41) = 1.81$, $p = .08$, 95% CI = [−0.20, 3.53], $r = .28$. Simple effects analyses revealed that among nonlonely participants (at −1 *SD*) who relived a neutral experience, the framing of the Eyes Test significantly affected performance, β = .47, $t(41) = 2.39$, $p = .02$, 95% CI = [0.54, 6.44], $r = .35$, with the social framing producing better performance than the nonsocial framing. The framing of the Eyes Test had a marginal effect among lonely participants (at +1 *SD*) who relived a neutral experience, β = −.34, $t(41) = -1.71$, $p = .09$, 95% CI = [−5.61, 0.47], $r = .26$, but in this case, the social framing resulted in poorer performance than the nonsocial framing. Tests of significance regions reveal that the framing of the Eyes Test had a significant impact at scores below 1.06 and above 2.61 on the loneliness scale. Altogether, these results fit the hypothesis that lonely people choke under social pressure (but perform reasonably well otherwise).

All these effects were apparently wiped out by having people relive an intense rejection experience. In the rejection condition, the effects of loneliness and task framing, and their interaction, were not significant. The rejection manipulation may have moderated the choking effect because lonely individuals were able to attribute their performance anxiety to the relived rejection experience.

Anagram task. To determine whether the choking effect is specific to social monitoring or whether it generalizes to other abilities, we conducted a hierarchical multiple regression analysis on anagram task performance. As in the previous analyses, centered loneliness scores, dummy-coded reliving condition, and dummy-coded task framing condition were entered in the first step, all two-way interactions were added in a second step, and the three-way interaction was added in a third step. As shown in Table 1, a significant main effect of task framing emerged, β = .22, $t(80) = 2.00$, $p = .05$, 95% CI = [0.003, 1.53], $r = .22$, with the social frame ($M = 2.28$, $SD = 1.87$) eliciting better performance than the nonsocial frame ($M = 1.57$, $SD = 1.59$). This effect was not anticipated, but perhaps participants found the socially framed task more motivating. We did not expect acute social threats or chronic belonging needs to affect performance on this

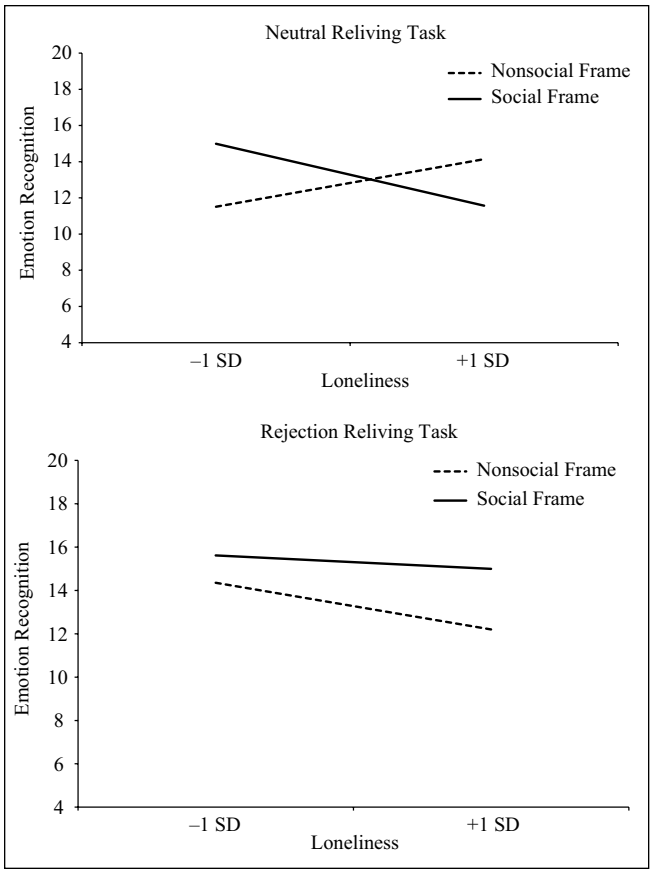

Figure 3. Facial expression recognition on the Reading the Mind in the Eyes Test as a function of participant loneliness, task framing, and reliving task condition (Study 3).

socially irrelevant task, and consistent with these expectations, no other main effects or interactions emerged, all *p*s > .29. Apparently, simply telling people that the task measured social skills was not sufficient to cause lonely people to choke.

Possible mechanisms. Having demonstrated that lonely individuals choked on the socially framed Eyes Test under neutral conditions, we next examined a number of factors that could serve as mediators under these circumstances. We averaged the items measuring motivation to perform well on the Eyes Test (α = .86, *M* = 3.96, *SD* = 1.26) and the items measuring anxiety experienced during the Eyes Test (α = .84, *M* = 1.81, *SD* = 0.69). Single items were used to measure related constructs—performance expectations on the Eyes Test (*M* = 4.44, *SD* = 1.62), performance estimates on the Eyes Test (*M* = 56.34%, *SD* = 26.36), and performance estimates in the real world (*M* = 73.61%, *SD* = 20.97). In five separate hierarchical regression analyses, we regressed each factor on dummy-coded framing condition and centered loneliness scores in a first step and added the Framing × Loneliness interaction in the second step. We excluded participants who had relived a rejection from these analyses, as we were only interested in examining these factors under neutral conditions, when individuals displayed the choking effect.

As shown in Table 2, no significant main effects or interactions[2] emerged in four of the analyses, suggesting that participants' motivation and their performance expectations and estimates are unlikely candidates for mediation. However, the fifth analysis revealed a main effect of loneliness on anxiety, β = .41, *t*(42) = 2.91, *p* = .006, 95% CI = [0.11, 0.62], *r* = .41, but it was qualified by a Frame × Loneliness interaction, β = .40, *t*(41) = 2.12 *p* = .04, 95% CI = [0.02, 0.99], *r* = .31, shown in Figure 4. Simple slope tests revealed that loneliness predicted anxiety among participants in the social framing condition, β = .70, *t*(41) = 3.63, *p* = .001, 95% CI = [0.27, 0.96], *r* = .49, but not the nonsocial framing condition, β = .13, *t*(41) = 0.67, *p* = .51, 95% CI = [−0.23, 0.45], *r* = .10. That is, under neutral conditions, to the extent participants were lonely, they felt more anxious in completing the socially framed tasks. Tests of simple effects revealed that task framing significantly affected the lonely (at +1 *SD*), β = .39, *t*(41) = 2.03, *p* = .05, 95% CI = [0.003, 1.10], *r* = .30, but not the nonlonely (at −1 *SD*), β = −.17, *t*(41) = −0.92, *p* = .36, 95% CI = [−0.78, 0.29], *r* = .14. In other words, the social framing of the tasks elicited greater anxiety among the lonely than the nonsocial framing. This pattern of data provides initial support for mediation.

To fully test a model of mediated moderation of the choking effect under control conditions, we excluded rejected participants and ran three multiple regression analyses using the Loneliness × Frame interaction as the causal variable, anxiety as the mediator, and performance on the Eyes Test as the outcome. These analyses revealed a significant relationship between the Loneliness × Frame interaction and performance on the Eyes Test, β = −.33, *t*(43) = −2.30, *p* = .03, 95% CI = [−4.12, −0.27], and a significant relationship between the Loneliness × Frame interaction and anxiety, β = .48, *t*(43) = 3.63, *p* < .001, 95% CI = [0.27, 0.95]. The third regression analysis revealed a marginal relationship between anxiety and performance on the Eyes Test, β = −.28, *t*(43) = −1.75, *p* < .09, 95% CI = [−3.18, 0.23]. To test our model of mediated moderation, we used the bootstrapping method with bias-corrected confidence estimates (see Preacher & Hayes, 2004). Specifically, we used Preacher and Hayes' (2008) INDIRECT macro with 5,000 bootstrap resamples to calculate the indirect path of the loneliness × frame interaction on Eyes Test performance through anxiety. The unstandardized path coefficients are displayed in Figure 5. Results indicate that anxiety experienced during the Eyes Test mediated the relationship between the Loneliness × Frame interaction and Eye Test performance, *B* = −0.92, 95% CI = [−2.21, −0.08]. Moreover, results suggest full mediation as the direct effect of the interaction on performance became nonsignificant, β = −.20, *t*(43) = −1.21, *p* = .23, 95% CI = [−3.44, 0.85], when controlling for anxiety.

Table 2. Results of Regression Analyses Examining Factors Related to Eyes Test Performance, Study 3.

Predicted variable, step, and predictor variable	*B*	β	*t*	*p*	95% CI
Motivation on Eyes Test					
Step 1					
Loneliness	22	.13	0.85	.40	[−0.31, 0.75]
Framing	0.48	.17	1.15	.26	[−0.36, 1.32]
Step 2					
Loneliness × Framing	0.81	.33	1.58	.12	[−0.22, 1.84]
Eyes Test performance expectations					
Step 1					
Loneliness	−0.36	−.18	−1.20	.24	[−0.98, 0.25]
Framing	0.08	.03	0.16	.87	[−0.91, 1.07]
Step 2					
Loneliness × Framing	0.91	.60	1.51	.14	[−0.31, 2.13]
Eyes Test performance estimates					
Step 1					
Loneliness	−13.99	−.16	−1.03	.31	[−15.41, 5.03]
Framing	−1.40	−.03	−0.22	.83	[−18.37, 14.80]
Step 2					
Loneliness × Framing	17.90	.38	1.82	.08	[−0.20, 37.81]
Real world performance estimates					
Step 1					
Loneliness	−1.83	−.07	−0.45	.65	[−10.00, 6.34]
Framing	1.08	.03	0.17	.87	[−12.02, 14.19]
Step 2					
Loneliness × Framing	14.20	.38	1.80	.08	[−1.73, 30.13]
Anxiety during Eyes Test					
Step 1					
Loneliness	0.36	.41	2.91	<.01	[0.11, 0.61]
Framing	0.14	.10	0.72	.48	[−0.26, 0.55]
Step 2					
Loneliness × Framing	0.51	.40	2.12	.04	[0.02, 0.99]

Note. Analyses performed under control conditions (neutral reliving tasks only) and included a dummy-coded variable for framing condition (0 = nonsocial, 1 = social). CI = confidence interval.

Study 3 provided further support for the choking hypothesis using a different social monitoring measure, and it revealed some boundary conditions. As in previous studies, lonely individuals performed worse on a social monitoring task when the social implications of the task were made salient. In comparison with Studies 1 and 2, the social stimuli used in the current study were more varied and required more fine-tuned recognition of others' emotional states, thus bolstering the generalizability of the choking effect to social monitoring in the real world. This choking effect was found only among lonely individuals who had not relived a past rejection. Perhaps lonely individuals attributed their anxiety on the socially framed social monitoring task to their previous rejection, which in turn, mitigated the choking effect. Also, of the two socially framed tasks, lonely individuals only choked on the Eyes Test, implying that the social framing instructions do not cause general impairments but specifically hinder social monitoring. In sum, lonely individuals performed worse than their nonlonely counterparts under the following conditions: when the task required social monitoring, when the task was purportedly diagnostic of social success, and when individuals were not under social threat (e.g., reliving rejection). Also, preliminary findings suggest that choking may be linked to lonely people's heightened feelings of anxiety rather than a lack of effort, negative performance expectations, or negative perceptions of their own performance. To gain a fuller understanding of the role anxiety plays in the choking effect, we designed a fourth study.

Study 4

Study 4 directly tested the role of anxiety by offering lonely persons the opportunity to misattribute their anxiety to some cause other than fear of doing badly on a test of social abilities. Specifically, some participants drank an ostensibly caffeinated beverage that could cause symptoms consistent with anxiety. We predicted that lonely people who misattributed

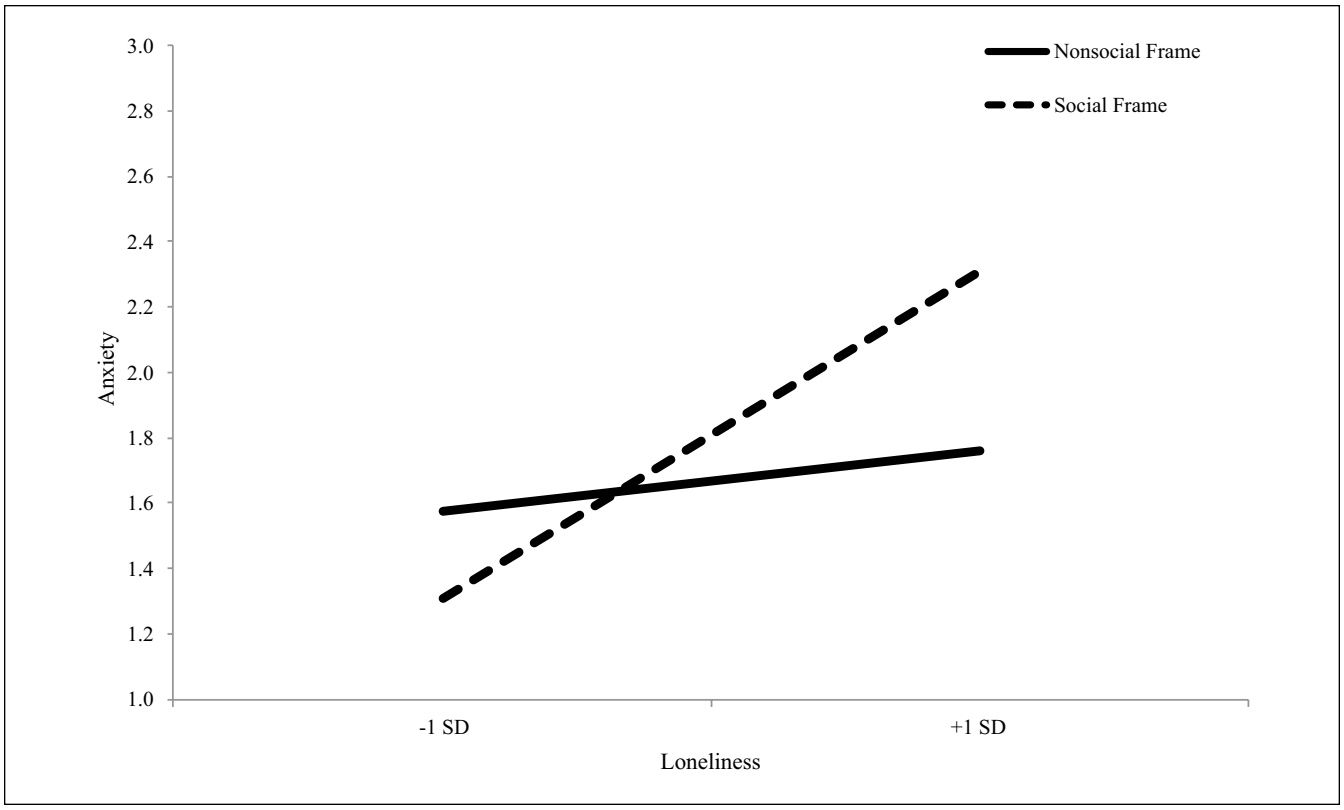

Figure 4. Self-reported anxiety as a function of participant loneliness and task framing under nonthreatening circumstances (Study 3).

their anxiety would perform as well as nonlonely people, even on a task framed as socially diagnostic.

Method

Participants and design. During a pre-testing session, students completed the 20-item R-UCLA Loneliness Scale, version 2 (Russell et al., 1980) using response options ranging from 1 (*never*) to 7 (*often*), as in Study 1. Of these students, 120 from the top third of the distribution and 111 from the bottom third were asked to participate for course credit. Of those 231 students (139 female), 17 were discarded due to suspicion about the cover story, and 11 others were discarded because they responded incorrectly when asked whether they had ostensibly consumed caffeine. The study used a 2 (misattribution condition: misattribution vs. control) × 2 (task framing: social vs. nonsocial) × 2 (pre-test loneliness: high vs. low) between-subjects design.

Procedure. Participants were told the study was about the effects of caffeine on task performance in line with previous misattribution research (e.g., Shepperd, Grace, Cole, & Klein, 2005). All participants ingested about 7 ounces of a beverage formulated to taste like an energy drink. It contained no sugar, calories, or caffeine. In the *misattribution condition*, however, participants were told that they were drinking "a new sugar-free energy drink that is highly caffeinated—more than Red Bull© or Jolt©. So, you may experience trembling, a fluttering of the heart, increased perspiration, and some feelings of anxiety during the tasks." Participants in the *control condition* were told this was a new flavor of sugar-free fruit drink. A filler drawing task was then performed, the purpose of which was ostensibly to allow time for the caffeine (in the misattribution condition) to take effect. After 10 min, participants completed the DANVA-2, the facial expression recognition task from Study 1. We were particularly interested in participants' performance on the more difficult trials corresponding to low-intensity expressions. As in Study 1, this task was framed as social or nonsocial. Suspicion probe and manipulation checks ensued.

Results and Discussion

Study 4 sought to replicate the choking effect and eliminate it by misattribution. We hypothesized that individuals who are able to misattribute their anxiety on the DANVA-2 to caffeine should not display the performance decrements associated with choking. Instead, only lonely participants unable to misattribute their anxiety on the socially framed task should demonstrate the choking effect. As such, we ran a planned contrast between that group (lonely participants receiving

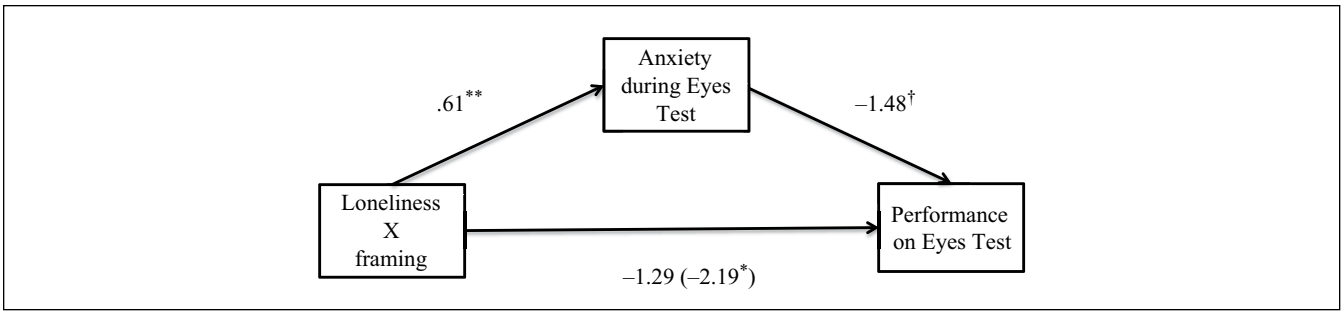

Figure 5. Indirect effect of Loneliness × Framing interaction on Eyes Test performance through anxiety experienced during the Eyes Test.
Note. Unstandardized coefficients are displayed.
†$p < .09$. *$p < .05$. **$p < .001$.

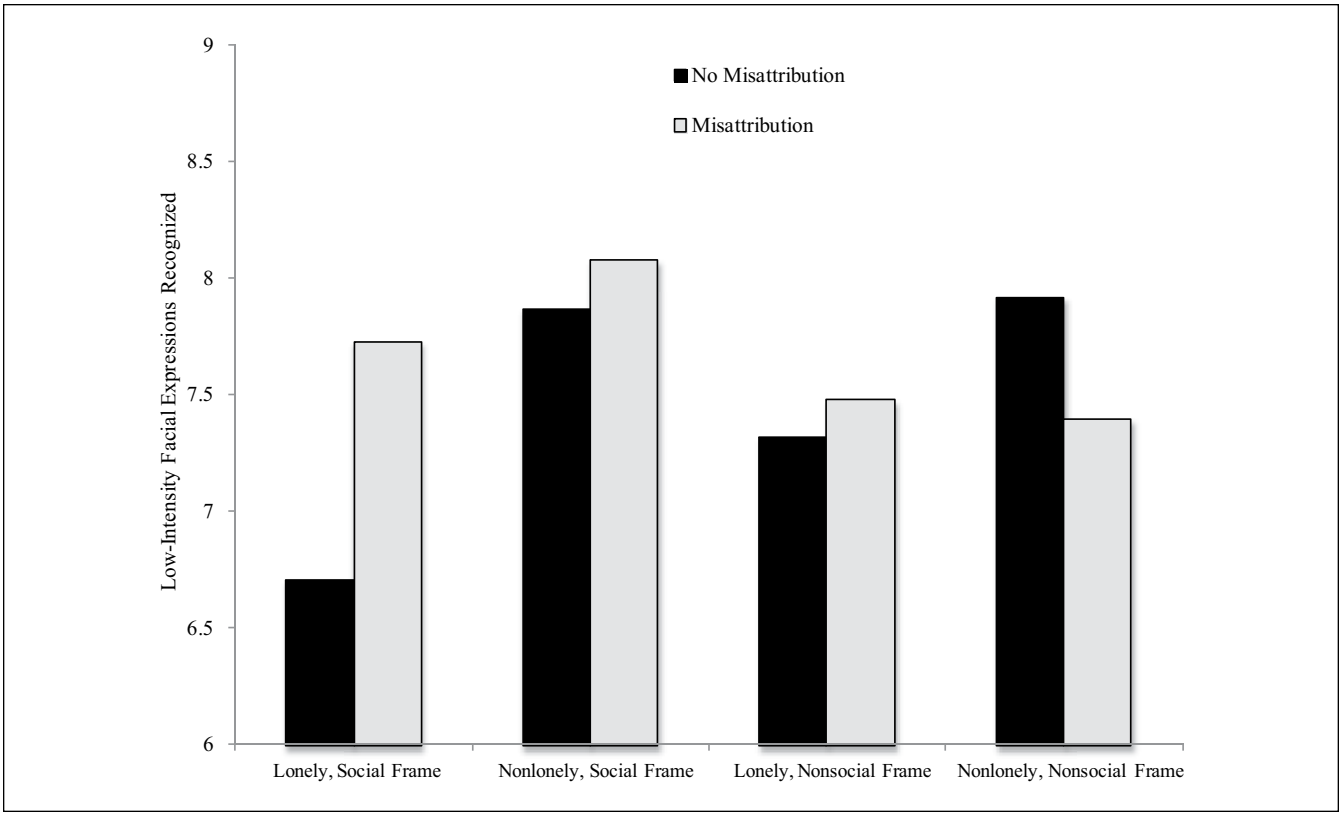

Figure 6. Low-intensity facial expression recognition on the DANVA-2 as a function of participant loneliness, task framing, and misattribution condition (Study 4).
Note. DANVA = Diagnostic Analysis of Nonverbal Accuracy.

the social frame without misattribution) and all other participants. As expected, this contrast indicated that lonely participants in the social framing and no-misattribution conditions did indeed perform worse than participants in all other conditions, $t(195) = -2.80$, $p = .006$, 95% CI = [−2.04, −11.46], $d = .40$, as illustrated in Figure 6.

In addition, we ran a second planned contrast to confirm that only lonely individuals unable to misattribute their anxiety performed worse on the socially framed task than the remaining participants who received the social frame. This analysis revealed that lonely participants in the no-misattribution condition performed significantly worse than all other participants in the social framing condition, $t(195) = -3.12$, $p = .002$, 95% CI = [−1.32, −5.77], $d = .45$. In sum, misattribution of anxiety eliminated the tendency to choke under pressure. Consistent with the meditational analysis in Study 3, these findings suggest that anxiety impairs lonely individuals' social cue sensitivity.

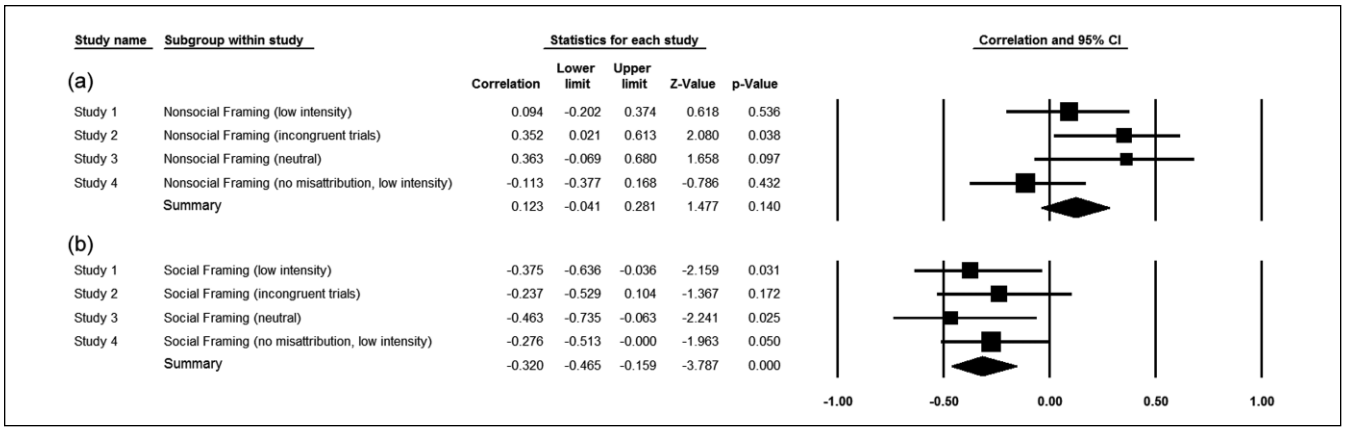

Figure 7. Forest plots displaying the relationship between loneliness and the most sensitive measures of social monitoring (e.g., low-intensity facial expressions and incongruent vocal tone trials) in (a) nonsocial conditions and (b) social conditions.
Note. CI = confidence interval.

Meta-Analysis

Method

As the results were not perfectly consistent across studies, we meta-analyzed the relevant correlations between loneliness and performance on the DANVA-2 (Study 1 and the no-misattribution condition of Study 4), the vocal tone identification task (Study 2), and the Eyes Test (neutral conditions only of Study 3). Those correlations tested the main hypothesis without mitigating factors (misattribution, reliving rejection, anagram test).

To examine the data exhaustively, we ran four separate meta-analyses under social and nonsocial framing conditions. In the first, we examined the relationships between loneliness and social performance using the most sensitive measures of social monitoring (low-intensity faces in Studies 1 and 4 and incongruent trials in Study 2). In the second, we examined the same relationships using the full facial expression and vocal tone measures. The third and fourth analyses replicated the first and second, but these latter analyses included the data from all discarded participants. Thus, the third and fourth analyses provide the most conservative tests of our hypothesis.

Results and Discussion

We meta-analyzed the findings in the social and nonsocial conditions separately using fixed effects models given the similarity in the studies' samples, measures, and manipulations. As shown in Figure 7, the results of the first meta-analysis (using the most sensitive measures) yielded support for the lonely choking hypothesis. When the social monitoring task was framed as socially diagnostic, lonely people performed significantly worse, $r = -.32$, $z = -3.79$, $p < .001$. In contrast, when the task was framed as academically (not socially) diagnostic, lonely people showed a trend toward performing better than nonlonely people, $r = .12$, $z = 1.48$, $p = .14$. This latter trend is consistent with previous research using similar social monitoring tasks (Gardner et al., 2005). Our second meta-analysis, which included the less sensitive measures of facial expression and vocal tone identification, yielded similar results. In comparison with the nonlonely, lonely participants performed significantly worse on the socially framed tasks, $r = -.31$, $z = -3.62$, $p < .001$, but just as well as or slightly better on the nonsocially framed tasks, $r = .12$, $z = 1.37$, $p = .17$. These findings suggest that the choking effect is robust enough to emerge even on less sensitive measures of social monitoring.

Finally, the third and fourth meta-analysis examined the same relationships but included all participants who had been excluded in prior analyses. The third meta-analysis revealed a significant negative relationship between loneliness and performance on the more sensitive social monitoring tasks framed in a social way, $r = -.21$, $z = -2.54$, $p = .01$, but not a nonsocial way, $r = .01$, $z = .17$, $p = .87$. The fourth meta-analysis, which used the full measures, yielded the same pattern of findings: a significant negative relationship under social framing conditions, $r = -.18$, $z = -2.16$, $p = .03$, and no relationship under nonsocial framing conditions, $r = .01$, $z = .16$, $p = .87$. These meta-analyses demonstrate that the choking effect emerges even under problematic conditions—when a subset of participants failed manipulation checks, did not follow instructions, and so on. The addition of these problematic participants washed away the positive trend between loneliness and social performance under nonsocial framing conditions, but the more important negative relationship between loneliness and performance under social framing conditions remained.

General Discussion

Many people wish to escape loneliness by connecting with others but are unsuccessful. The present investigation suggests one reason for their failure: Social situations create worrisome demands to excel, which stimulate anxiety and impair lonely people's ability to process social information

accurately. In other words, lonely people choke under social pressure.

Some theorists have proposed that lonely people suffer from social skills deficits. Our results did not support that view. Across four studies, we found that lonely people performed the social monitoring tasks quite well—as long as the task was not framed as a test of their social skills. Findings suggest that lonely people possess the social monitoring skills necessary to read the emotions underlying others' facial expressions and verbal utterances. The problem is that lonely people's social monitoring skills apparently fail them precisely when they need them. That corresponds to the familiar pattern of choking under pressure, such as when an expert athlete or musician errs during a highly important performance.

The anticipated pattern of findings emerged in all four studies, although the size of the choking effect varied from study to study, likely due to measurement sensitivity, task framing, and other factors. Also, each individual study was underpowered because of our reliance upon small samples. This limitation was remedied by meta-analyzing our findings to reveal a clear choking effect. Relative to the individual studies, the meta-analysis provides persuasive evidence of lonely individuals' choking under social pressure.

Potential Mechanisms

One might attribute the choking effect among the lonely to their negative performance expectations. Perhaps lonely individuals choke on socially framed tests of interpersonal skills because they expect to perform poorly on them. Such negative expectations might produce a self-fulfilling prophecy (Spitzberg & Canary, 1985). Similarly, people who fear that they might confirm the stereotype of the socially incompetent lonely person (assuming such a stereotype exists) might perform worse on social monitoring tasks when their social implications are made salient. Such a finding would be consistent with the stereotype threat literature (Steele & Aronson, 1995). Like men who perform worse on social sensitivity tests framed in a gendered way (Koenig & Eagly, 2005), lonely people might perform worse on social monitoring tasks framed in a social way. Contrary to those explanations, lonely participants in Study 3 did not anticipate performing any worse on a measure of social skills than nonlonely participants. Consequently, it is unlikely that their expectations mediate their performance decrements. Because both self-fulfilling prophecies and stereotype threat would require lonely and nonlonely people to differ in their expectations, neither of these accounts can explain lonely people's choking on socially framed tests of social skills.

Another possible explanation for poor performance is lack of effort, possibly caused by self-protective withdrawal of effort or loss of motivation. One might propose that lonely people do not care enough to try to perform well on social tasks. Our results contradicted that view. Study 3 found that lonely and nonlonely people were just as motivated to perform well when the task was framed as social in nature.

Unlike performance expectations and motivation, anxiety seems to play an important role in producing choking. Heightened anxiety experienced during socially framed tasks mediated the drop in social performance (Study 3). When lonely people were able to attribute their anxiety to a past rejection experience (Study 3) or encouraged to (mis)attribute their anxiety to caffeine (Study 4), they performed well even when the task was framed as a test of social skills. Apparently, allowing the lonely to dismiss their anxieties as stemming from another task or being side effects of caffeine enabled them to avoid choking under pressure. Altogether, these findings suggest that the pressure of social challenges causes anxiety that impairs the performance of lonely people, and taking the anxiety out of the performance context (by misattribution) improves their performance.

Future Directions

The misattribution findings may be relevant not only to our hypotheses about lonely people but could have powerful implications for a broad range of skilled performances. Many skilled performers suffer from tendencies to choke at crucial moments during highly important performances. Further work is warranted to establish whether effective misattribution might reduce or eliminate those unfortunate lapses, thereby enabling people to perform up to their potential.

The current investigation is a first step in reconciling disparate findings pertaining to lonely individuals' social skills deficits (e.g., W. H. Jones et al., 1982) and their superior monitoring of social cues (Gardner et al., 2005). Current findings suggest that lonely people experience anxiety when performing tasks with social implications, and such anxiety detracts from their performance. Just as anxiety played a role in lonely people's identification of emotional expressions, anxiety likely hinders lonely individuals' ability to express themselves in live interactions (Gerson & Perlman, 1979). Perhaps Jones and colleagues' lonely participants had difficulty attending to their conversation partner (W. H. Jones et al., 1982) because evaluative anxiety occupied their working memory or they explicitly monitored this proceduralized behavior. The current research suggests that lonely people should be capable of excelling in social contexts examined in past research *if* the social implications of their performance can be downplayed and/or their anxiety attributed to another source. That said, future research is needed to confirm that similar processes are at play in real life interactions.

Relatedly, the current research used the DANVA-2, a vocal identification task, and the Eyes Test in a controlled setting to focus on particular skills involved in the monitoring of one's social environment. Because our studies isolated specific social skills (e.g., identification of emotional expressions), we cannot draw strong conclusions about lonely individuals' overall social competence. We would expect lonely

people to choke when performing more complex social skills under socially evaluative conditions, but future work is needed to examine their performance on more holistic measures of social coordination or social competence.

Future research should examine the extent to which this choking effect extends to other populations and social contexts. Unlike adolescents and young adults whose loneliness is associated with perceived peer acceptance and adjustment to college life (e.g., Cutrona, 1982; Vanhalst, Luyckx, Scholte, Engels, & Goossens, 2013; Woodhouse, Dykas, & Cassidy, 2012), older adults often experience loneliness for different reasons. Their loneliness may stem from or be exacerbated by chronic illness, hearing loss, diminished independence, and the deaths of loved ones (e.g., Barlow, Liu, & Wrosch, 2014; Ben-Zur, 2012; Newall, Chipperfield, & Bailis, 2014; Perlman, Gerson, & Spinner, 1978; Pinquart & Sorensen, 2001). Consequently, older individuals may be less susceptible to the choking effect as they likely attribute their loneliness to age-related factors rather than their social performance. Moreover, older lonely individuals may be less likely to choke in their social interactions given that their relationships are well established. Younger individuals may be more prone to choke as they are more likely to interact with new, unfamiliar others. Additional research is needed to determine the extent to which choking occurs when interacting with familiar others and in familiar environments.

Conclusion

Our findings suggest that lonely people feel anxious when the social implications of their performance are made salient, and this heightened anxiety undermines their performance. That is, they choke under social pressure. Even though lonely people have a lot to gain in their social interactions, their social skills fail them in social situations.

Understanding some ways in which lonely people are authors of their own misfortunes holds promise of showing how some people might be able to reduce their suffering by changing their behaviors. We were able to eliminate choking by having lonely people misattribute their anxiety to caffeine and by having them recall a prior rejection experience. Other interventions may be possible. As research discovers new methods to counteract choking among skilled athletes and musicians, they may also prove useful to help lonely people perform better socially. For instance, under normal circumstances, skilled golfers encouraged to not second-guess themselves can avoid choking because they engage in less anxiety-induced self-monitoring (Beilock, Bertenthal, Hoerger, & Carr, 2008). Similarly, lonely people could be encouraged to make social judgments without second-guessing themselves to stop anxiety and self-monitoring from interfering with their social performance. Altogether, our findings show that lonely people do have the skills to read other people's emotions accurately. The challenge is to enable them to use their skills effectively instead of choking.

Declaration of Conflicting Interests

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Notes

1. We also included three items pertaining to heightened arousal from Mothersill, Dobson, and Neufeld (1986): "I enjoyed the situation," "I felt exhilarated and thrilled," and "I seek experiences like this." Because we were only interested in participants' negative experience of anxiety and arousal, we did not include those items in our index of anxiety.
2. Marginal or trend-like interactions emerged in these four analyses. These trends may be spurious, but their sheer number across multiple measures warrants cautious exploration. For motivation, tests of simple slopes revealed that loneliness predicted motivation to perform well on the Eyes Test when framed in a social way, $\beta = .37$, $t(41) = 1.73$, $p = .09$, 95% confidence interval [CI] = [−0.11, 1.37], but not a nonsocial way, $\beta = -.10$, $t(41) = -0.50$, $p = .62$, 95% CI = [−0.90, 0.55]. Thus, to the extent individuals reported feeling lonely, they were somewhat *more* motivated to perform well on the socially framed Eyes Test. Thus, the poorer performance on the socially framed Eyes Test among the lonely cannot be attributed to a lack of effort or motivation to do well.

   A different pattern of findings emerged for performance expectations and estimates. When the Eyes Test was socially framed, loneliness was unrelated to performance expectations, performance estimates, and real world performance estimates, all βs < .21, all ts < .96, all ps > .34, suggesting that these factors do not contribute to lonely participants' choking under social pressure. Surprisingly, when the Eyes Test was nonsocially framed, loneliness predicted lower performance expectations, $\beta = -.40$, $t(41) = -1.93$, $p = .06$, 95% CI = [−1.67, 0.04], lower performance estimates, $\beta = -.43$, $t(41) = -2.03$, $p = .05$, 95% CI = [−27.95, −0.03], and lower real world performance estimates, $\beta = -.34$, $t(41) = -1.59$, $p = .12$, 95% CI = [−19.99, 2.36].

   By parsing these interactions, we see that loneliness was associated with greater motivation to perform well on the socially framed Eyes Test and lower performance expectations and estimates on the nonsocially framed Eyes Test. That said, these findings must be interpreted with caution as most of these tests failed to surpass traditional significance levels.

Supplemental Material

The online supplemental material is available at http://pspb.sagepub.com/supplemental.

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