

## **SOCIAL ANXIETY IN RELATION TO SELF-CONTROL DEPLETION FOLLOWING SOCIAL INTERACTIONS**

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Although prior research suggests that high social anxiety is associated with poor self-control during and after social interactions, only a few studies have formally tested this relationship. The current research therefore includes three studies examining how social anxiety is related to self-control. Study 1 showed that social anxiety is negatively related to general trait self-control. Studies 2 and 3 showed that higher social anxiety is related to poorer behavioral self-control after two types of social interactions, social evaluation and working with another person on a task. These results demonstrate that higher social anxiety is indeed related to decrements in self-control following social interaction. This suggests that socially anxious individuals are at risk of exhibiting poor self-control during and/or after social interactions, which has many negative implications, including poor interpersonal relationships and an exacerbation of social anxiety symptoms.

The ability to control and regulate impulses, desires, wishes, emotions, and other behaviors is a core feature of the self. In fact, many vital functions of the self involve regulation, such as making decisions, inhibiting and initiating behavior, taking responsibility, and making and carrying out plans (Baumeister, 1998). As a result, ex-

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erting self-control can improve health (e.g., eating healthier, exercising), decision-making, academic achievement, and job/career performance. For instance, Baumeister, Heatherton, and Tice (1994) showed that poor self-control has been linked to a failure to set and/or accomplish goals, failure to delay gratification, self-handicapping and procrastination, overeating, gambling, and alcohol and drug abuse.

Research has also shown that self-regulation is a particularly important aspect of social relationships. For instance, Tangney, Baumeister, and Boone (2004) found that self-control was positively related to a secure attachment style. Higher self-control is also related to better interpersonal accommodation, greater romantic relationship satisfaction, and a greater likelihood of having a constructive response to conflict with a romantic partner (Finkel & Campbell, 2001). Those with greater self-control also show less conflict and more cohesion with family members (Tangney et al., 2004). In addition, those who exert self-control tend to gain social acceptance from others, whereas those who do not tend to be socially rejected and ostracized by their peers (e.g., Feldman, Rosenthal, Brown, & Canning, 1995; Ferrer & Krantz, 1987).

These findings suggest that low self-control is a significant risk factor for a wide range of individual and interpersonal difficulties. Low self-control therefore increases susceptibility to a myriad of problems. Self-control appears to diminish with use, however. When one exerts regulatory control on one task, that person will exhibit reduced self-control on a subsequent task due to depleted self-control resources (Muraven & Baumeister, 2000). For example, numerous studies have shown that exerting self-control on an initial task, such as overriding dominant response tendencies, persisting in the face of difficulty or boredom, restricting impulses, or suppressing emotions results in self-control decrements on a subsequent task (see Hagger, Wood, Stiff, & Chatzisarantis, 2010). According to the process model of self-control (Inzlicht & Schmeichel, 2012), this effect is driven by two processes, motivation and attention. When people engage in tasks requiring self-control, they experience reduced motivation to exert self-control on subsequent tasks and experience increased motivation to act on impulses. In addition, engaging in self-control reduces attention to cues signaling the need for self-control and increases attention toward cues signaling possible rewards.

Although self-control depletion has most commonly been shown after participants complete non social tasks requiring self-control (e.g., not eating freshly baked chocolate chip cookies on a plate in front of them but instead eating carrots), research has shown that social situations can deplete self-control resources as well. For instance, being socially rejected or ostracized by peers or told that you are the kind of person that will end up alone in life leads to self-control depletion (Baumeister, DeWall, Ciarocco, & Twenge, 2005; Oaten, Williams, Jones, & Zadro, 2008). Lowered feelings of belongingness also result in a greater likelihood of self-control failure (Blackhart, Nelson, Winter, & Rockney, 2011). Furthermore, research shows that presenting oneself in ways that contradict social norms, or under challenging conditions, leads to self-control depletion (Vohs, Baumeister, & Ciarocco, 2005). Similarly, experiencing effortful and inefficient social coordination reduces self-control (Finkel et al., 2006).

## **SOCIAL ANXIETY AND SELF-CONTROL DEPLETION**

For people with social anxiety, simply interacting with others may be depleting. According to Kashdan, Weeks, and Savostyanova (2011), "...socially anxious people devote considerable self-regulatory resources (e.g., attention, physical stamina, and impulse control) to fearing, controlling, and avoiding anxious thoughts, feelings, and behaviors" (p. 787). Kashdan et al. (2011) proposed that people higher in social anxiety exert greater self-control in most social interactions than those lower in social anxiety, but self-control demands will be especially great during stressful or difficult social interactions. Further, socially anxious people are often concerned with possible social rejection. As a result, they frequently engage in prevention behaviors, such as excessive nodding or reassurance seeking, talking very little, or deflecting attention by asking questions of others (Clark & Wells, 1995). In addition, research shows that when people allocate resources to regulating anxiety or to impression management, they tend to show impairments to other goal-directed behaviors (Finkel et al., 2006; Kashdan, Breen, & Julian, 2010; Vohs et al., 2005). These behaviors may place an additional burden on self-control resources.

In turn, self-control depletion appears to diminish the positive experiences and outcomes that socially anxious individuals might

experience within social situations, thereby exacerbating social anxiety symptoms (Kashdan et al., 2011). That is, because socially anxious individuals are attempting to manage their anxiety and are engaging in behaviors meant to avoid social rejection, they fail to attend to the possible rewards of a positive social interaction. As a result, they experience less positive affect after a positive social interaction and feel less connected to others (see Kashdan et al., 2011). Such feelings may contribute to and reinforce social anxiety, creating a cyclical pattern of behaviors.

The purpose of the current research is to examine the extent to which social anxiety impedes self-control in social situations. There is some empirical evidence that social anxiety does interfere with self-control during or after social interaction. For instance, Oaten et al. (2008) examined self-control immediately after and 45 minutes after an episode of ostracism in socially anxious and non socially-anxious individuals. In both studies, immediately after being ostracized, all participants exhibited self-control depletion and reported threats to belonging, self-esteem, control, and meaningful existence. Only socially anxious individuals, though, continued to exhibit deficits in self-control and threatened needs 45 minutes later. Mallott, Maner, DeWall, and Schmidt (2009) found that following social rejection, socially anxious individuals exhibited fewer prosocial behaviors and more negative social responses (poorer eye contact and vocal quality during an interaction with a new partner) than non-socially anxious individuals. This may suggest failure for socially anxious individuals to effectively regulate their social behaviors in order to gain social acceptance.

Kashdan et al. (2013) tested the relationship between social anxiety and self-control depletion more directly than the prior two studies and found that socially anxious individuals exhibited self-control depletion. Participants diagnosed with Social Anxiety Disorder (SAD) and healthy controls were provided with hand-held devices and asked to describe every face-to-face social interaction lasting 10 minutes or more during a 2-week period. Among other variables, participants' self-control depletion was assessed following each interaction by asking two items, "I feel mentally exhausted" and "Right now, it would take a lot of effort for me to concentrate on something" (Kashdan et al., 2013, p. 649). SAD was directly related to the measure of self-control depletion following face-to-face conversations. That is, those with SAD reported feeling more depletion following social interactions than did healthy controls.

## DISCOUNTING THE BENEFITS OF POSITIVE SOCIAL INTERACTIONS

Not only do socially anxious individuals fail to attend to positive rewards that result from social interactions, they also appear to actively discount the benefits of a positive social interaction (see Kashdan et al., 2011). For instance, socially anxious individuals tend to attribute the success of a social interaction not to their own ability or effort but rather to external factors (Heimberg & Becker, 2002). Disqualifying positive social outcomes has been shown to mediate the negative relationship between social anxiety and positive affect (Vassilopoulos & Banerjee, 2010). In addition, according to Kashdan et al. (2011), “Intentionally discounting positive social situations—an act of self-control—can be expected to exhaust the self-regulatory resources necessary to effectively attend to potentially rewarding situations, and to exploit them for positive experiences” (p. 792). Prior research has not, however, explicitly examined whether discounting positive social events is related to lower self-control. The current research therefore sought to replicate research showing a link between social anxiety and discounting and to establish a link between discounting and self-control.

## THE PRESENT RESEARCH

As theory (Kashdan et al., 2011) and prior research suggest that social anxiety may interfere with the ability to engage in self-control during or after social interactions, the aim of the current research was to further establish the link between social anxiety and self-control depletion by examining the relationship between social anxiety and self-control in a laboratory setting. Study 1 was designed to examine the link between social anxiety and general (trait) self-control. Studies 2 and 3 examined how social anxiety influenced behavioral self-control following a social interaction. We predicted that social anxiety would be negatively related to trait and behavioral self-control. Studies 1 and 3 also examined whether discounting positive interactions was related to (1) social anxiety and (2) lower self-control. Distinct from previous research conducted on the topic, we sought to test the relationship between social anxiety and self-control in a laboratory setting using behavioral measures

of self-control (Studies 2 and 3). Furthermore, as this is a relatively novel area of scientific inquiry, we did not exclude any participants based on their social anxiety scores nor did we specifically recruit only those participants who were diagnosed with SAD. Rather, for the present research we sought to examine participants within a full spectrum of social anxiety in order to accurately assess how various levels of social anxiety influence self-control following social interactions.

## STUDY 1

Study 1 examined the relationship between social anxiety and trait self-control and also had participants engage in a face-to-face social interaction in order to strengthen external validity. In addition, because Kashdan et al. (2011) proposed that intentionally discounting positive social events might cause self-control depletion for socially anxious individuals, we examined whether discounting the positive aspects of a social interaction was related to social anxiety and to self-control.

For Study 1, it was hypothesized that (1) overall, those higher in social anxiety would report lower trait self-control and discount the positive social interaction more than those lower in social anxiety; and (2) similar to social anxiety, discounting would be negatively related to trait self-control.

## METHOD

### Participants

One hundred seventeen female college students ranging in age from 18–53 years ( $M_{Age} = 20.81$ ,  $SD = 4.70$ ) participated in this study. Participants were recruited online through the Sona Systems participant management software at their university. All participants and confederates were female to control for a possible gender effect during the interaction. Although ideal to match participants and confederates on gender, the lab consisted of only female confederates during the semester in which the study was conducted. As a result, we chose to only run female participants in the present study. Participants received course credit for participation.

## Materials and Procedure

After providing informed consent, participants completed the Social Interaction Anxiety Scale (SIAS) and the Social Phobia Scale (SPS; Mattick & Clarke, 1998) as measures of social anxiety. The SIAS consists of 19 items ranked on a 0–4 Likert scale, with 0 = not at all and 4 = extremely, that assesses fears related to general social interactions. Example items include, “I have difficulty talking with other people” and “I am at ease meeting people at parties, etc.” (reverse scored). The SPS assesses fears of being evaluated or scrutinized while engaging in routine daily activities (i.e., scrutiny fears). It consists of 20 items ranked on the same scale as the SIAS. Example items include, “I get tense when I speak in front of other people” and “I feel self-conscious if I have to enter a room where others are already seated.” Mattick and Clarke (1998) suggest using both assessments as companion measures in order to comprehensively assess social phobia fears. The two measures were developed because Mattick and Clarke theorized that although social interaction anxiety and the fear of being scrutinized by others likely often coexist, interaction anxiety may exist without scrutiny fears and scrutiny fears may exist without interaction anxiety. Both scales have been shown to have strong internal consistency, test-retest reliability, and construct validity (Mattick & Clarke, 1998). They also appear to be appropriate for use in clinical settings and in research applications (Mattick & Clarke, 1998). For the current study, internal consistency reliability was good for both scales ( $\alpha = .92$  for the SIAS and  $.90$  for the SPS). Participants also completed the Liebowitz Social Anxiety Scale (LSAS) as an additional measure of social anxiety (Liebowitz, 1987). The LSAS consists of 24 items that assesses situations related to social interaction (e.g., Going to a party) and performance (e.g., Speaking up at a meeting). Participants are asked to rate their fear/anxiety, rated on a 0 (none) to 3 (severe) Likert scale, and avoidance, rated on a 0 (never) to 3 (usually) Likert scale, for each activity during the past week. When fear/anxiety and avoidance are combined, scores can range from 0–144, with higher scores indicative of greater social anxiety. Heimberg et al. (1999) showed the LSAS to be a reliable and valid measure of social anxiety. For the current study, internal consistency reliability was good ( $\alpha = .93$ ).

Participants also completed the brief version of the Self-Control Scale (Tangney et al., 2004). The Self-Control Scale is designed to assess individual differences in trait self-control by assessing self-con-



trol in the four major domains of self-control, controlling emotions, thoughts, behaviors, and impulses (see Baumeister, Heatherton, & Tice, 1994). The scale consists of 13 items ranked on a 1–5 Likert scale with 1 = not at all and 5 = very much. Example items include, “I am good at resisting temptation” and “I have a hard time breaking bad habits” (reverse scored). Tangney et al. found it to be a valid assessment of general trait self-control. They also showed the scale to have good internal consistency reliability as well as test-retest reliability (Tangney et al., 2004). The brief version of the Self-Control Scale correlated highly with the full version of the Self-Control Scale (Tangney et al., 2004). In the current study,  $\alpha = .84$ .

Participants next interacted with an experimental confederate on a problem solving activity. The participant and confederate were presented with a list of potential problems at their university (e.g., parking, rising tuition costs, quality of student health care) and they were instructed to discuss one or more of those issues and to generate possible solutions to the problem with their partner. They could also generate their own list of potential problems. They were instructed to list the problem(s) discussed as well as their possible solutions. Participants and confederates were given 5 minutes to complete the task. Confederates were instructed to make the interaction positive by making eye contact, smiling, and acting in a friendly demeanor during the interaction. Confederates were also directed to work collaboratively with participants on the task, providing some possible solutions and to politely prompt participants for responses (e.g., “Do you have any ideas?” “What do you think?”) if a participant was reluctant to help provide potential solutions.

After the interaction, participants rated how positively they perceived the social interaction by completing a measure designed to assess discounting of the positive aspects of the social interaction. The scale included six items ranked on a 1–7 Likert scale with 1 = Strongly Disagree and 7 = Strongly Agree. Items included, “My partner was only friendly toward me because he/she was pretending,” “My partner was only nice to me because he/she was behaving according to social etiquette,” “Any interest my partner showed in me was only temporary and superficial,” “I distrust my partner and/or his/her motives because he/she was friendly toward me,” “My partner was only nice to me because he/she doesn’t know me well,” and “If I were to see my partner outside of this study, he/she would acknowledge me” (reverse scored;  $\alpha = .71$ ). Higher scores are indicative of more discounting. The scale items were based on



the Discounting of Positive Events scale (Vassilopoulos & Banerjee, 2010). Whereas the Discounting of Positive Events scale was designed to assess general discounting at a trait level, we wished to assess discounting after a specific event at a state level. As a result, we revised five of the items (the first five items listed above) from the original scale and added a sixth item (the last item listed above) in order to assess state discounting. We did not include the other five items from the original Discounting of Positive Events scale because they did not lend well to assessing state discounting in this particular study setting. Participants then completed a demographics questionnaire and a funnel debriefing procedure before exiting the lab.

## RESULTS AND DISCUSSION

We first examined all variables for skewness and kurtosis; all variables were relatively normally distributed. In support of our first hypothesis, correlation analyses indicate that those higher in social anxiety reported lower overall trait self-control (for social interaction anxiety,  $r = -.18$ ,  $p = .048$ ; for scrutiny fears,  $r = -.20$ ,  $p = .034$ ; for LSAS,  $r = -.28$ ,  $p = .002^1$ ). Consistent with previous research (e.g., Vassilopoulos & Banerjee, 2010), socially anxious individuals also rated the interaction as less positive by discounting the positive interaction to a greater extent than those lower in social anxiety (for social interaction anxiety,  $r = -.27$ ,  $p = .003$ ; for scrutiny fears,  $r = -.23$ ,  $p = .012$ ; LSAS scores, however, were not significantly related to discounting,  $r = -.18$ ,  $p = .054$ ), also supporting our first hypothesis. Finally, results support our second hypothesis showing that those that engaged in greater discounting reported lower trait self-control,  $r = -.32$ ,  $p < .001$ . See Table 1 for all correlation coefficients.

## STUDY 2

Study 1 showed a link between social anxiety and trait self-control. A major limitation of Study 1, however, is that the results were based on cross-sectional, self-report data. The purpose of Study 2

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1. In a previous unpublished study conducted in our lab, in which participants only completed the LSAS ( $\alpha = .95$ ) and the brief Self-Control Scale ( $\alpha = .84$ ), ( $n = 304$ ,  $M_{Age} = 22.02$ ,  $SD = 6.02$ , 75% females), we found similar results,  $r = -.34$ ,  $p < .001$ .

**TABLE 1. Zero-Order Correlation Coefficients, Means, and Standard Deviations for Study 1**

	1	2	3	4	5
1. Trait self-control		–			
2. Social interaction anxiety	– 0.18*	–			
3. Scrutiny fears	– 0.20*	0.77*	–		
4. LSAS	– 0.28*	0.77*	0.74*	–	
5. Discounting	– 0.32*	0.27*	0.23*	–0.18	–
Mean	43.91	20.04	16.15	41.86	13.73
SD	8.20	12.99	11.73	20.42	5.46

Note. LSAS = the Liebowitz Social Anxiety Scale. \* $p < .05$ .

was to therefore examine how social anxiety impacted behavioral self-control after a social interaction. Specifically, participants gave a 5-minute speech and were evaluated by two individuals. Afterward, participants were given the opportunity to eat a good tasting but unhealthy food. The amount of food consumed served as a measure of self-control. We predicted that participants higher in social anxiety would exhibit less self-control after being socially evaluated.

## METHOD

### Participants

Seventy-six college undergraduates (46 females, 30 males) participated in the study ( $M_{Age} = 22.22$ ,  $SD = 7.59$ ). Participants were recruited online through the Sona Systems participant management software at their university. They received course credit for participation.

### Materials and Procedure

As part of the cover story, participants were told that they were participating in two separate studies. The first study was a psychological study assessing how well people perform under various pressures. The second study was a marketing study assessing preferences for a particular kind of food. As part of the first study, participants completed the brief Self-Control Scale ( $\alpha = .79$ ), as well as

the SIAS ( $\alpha = .93$ ) and the SPS ( $\alpha = .83$ ) as measures of social anxiety (Mattick & Clarke, 1998).

Participants also completed the Balanced Inventory of Desirable Responding (BIDR; Paulhus, 1991), which was designed to assess social desirability. It consists of 40 items using 7-point ratings, ranging from 1 = not true to 7 = very true, and includes two subscales (each consisting of 20 items) that measure impression management, example items: "I always obey laws, even if I'm unlikely to get caught" and "I sometimes drive faster than the speed limit" (reverse scored) and self-deceptive enhancement, example items: "I never regret my decisions" and "I have not always been honest with myself" (reverse scored). As reported in Paulhus (1991), Paulhus (1988) found that the BIDR is a valid assessment of social desirability and has shown good internal consistency reliability and adequate test-retest reliability. We were specifically interested in assessing impression management, or the tendency to exaggerate virtue, for the current study as Uziel and Baumeister (2012) found that impression management enhanced self-control in social situations. As a result, only the impression management subscale was used for the current study ( $\alpha = .73$ ).

After completing these questionnaires, participants engaged in a 5-minute free speech similar to that used in a portion of the Trier Social Stress Test (TSST; Kirschbaum, Pirke, & Hellhammer, 1993). Participants were informed that they would take on the role of a job applicant who was invited for an interview with two managers. They were told that they had 5 minutes to introduce themselves to the managers and to convince the managers that they were an excellent fit for one of many vacant positions at the company. Participants were told that the managers would assess not only the content of their speech but also their nonverbal behaviors. They were also told that the speech would be video recorded. Participants were given 10 minutes to prepare their speech but they were not allowed to use any of their notes during the speech. The managers timed the length of the participants' speeches. When a participant did not use the entire 5 minutes, the managers prompted him or her to continue his/her speech. Prior research has shown the TSST to increase state anxiety (e.g., Birkett, 2011; Hellhammer & Schubert, 2012). In addition, other studies have employed a similar free speech task to induce anxiety in socially anxious individuals (e.g., Abbott & Rapee, 2004; Chen, Rapee, & Abbott, 2013; Rapee & Abbott, 2007; Rapee & Lim, 1992).

After giving the speech, participants moved on to the second part of the study. They were given 35 bite-size chocolate chip cookies in a bowl. They were told to eat as many cookies as necessary in order to assess the taste, smell, texture, and overall quality of the cookies. Participants were given a rating form on which to assess these qualities (the rating form was included as part of the cover story for the task)<sup>2</sup> and 10 minutes to complete the task alone in a lab room. The number of cookies consumed served as a measure of self-control (Baumeister et al., 2005; Hagger et al., 2010), such that consumption of more cookies reflects less self-control. Participants next completed a demographics questionnaire and a funnel debriefing procedure before exiting the lab.

## RESULTS AND DISCUSSION

We first examined all variables for skewness and kurtosis. Because scrutiny fears was positively skewed, we conducted a square root transformation on that variable. All other variables were relatively normally distributed. Correlation coefficients show that results from Study 1 were replicated in that significant negative correlations were found between trait self-control and social anxiety (see Table 2). To test our hypothesis that those higher in social anxiety would exhibit less self-control after being socially evaluated, a hierarchical multiple regression analysis was conducted entering impression management as a predictor of cookie consumption at Step 1 and social interaction anxiety and scrutiny fears as predictors of cookie consumption in Step 2. Social interaction anxiety,  $\beta = .30$ ,  $t = 2.06$ ,  $p = .043$  ( $B = .093$ ,  $SE_B = .045$ , 95% CI = .003, .184), and impression management,  $\beta = -.25$ ,  $t = -2.28$ ,  $p = .026$  ( $B = -.063$ ,  $SE_B = .028$ , 95% CI = -.118, -.008), were significant predictors of the number of cookies consumed. Scrutiny fears was not a significant predictor of the number of cookies eaten. When impression management was not included as a predictor of the number of cookies consumed, the results were nearly identical; social interaction anxiety significantly

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2. Participants rated these qualities on a 1–7 Likert scale with 1 = extremely unpleasant and 7 = extremely pleasant. The means and standard deviations for each variable indicate that participants generally liked the cookies (for taste,  $M = 5.19$ ,  $SD = 1.22$ ; for smell,  $M = 5.06$ ,  $SD = 1.26$ ; for texture,  $M = 4.21$ ,  $SD = 1.38$ ; for overall quality,  $M = 5.02$ ,  $SD = 1.14$ , and for how likely participants would be to buy a box of the cookies,  $M = 4.39$ ,  $SD = 1.84$ ).

**TABLE 2. Zero-Order Correlation Coefficients, Means, and Standard Deviations for Study 2**

	1	2	3	4	5
1. Trait self-control	–				
2. Social interaction anxiety	– 0.38*	–			
3. Scrutiny fears	– 0.34*	0.67*	–		
4. Impression management	0.58*	– 0.20	– 0.26*	–	
5. Cookies consumed	– 0.22	0.32*	0.24*	– 0.30*	–
Mean	45.02	21.36	15.38	79.68	4.68
Standard Deviation	8.13	12.89	8.93	16.11	4.00

Note. \* $p < .05$

predicted the number of cookies consumed,  $\beta = 0.32$ ,  $t = 2.10$ ,  $p = .039$  ( $B = .098$ ,  $SE_B = .047$ , 95%  $CI = .005, .191$ ), but scrutiny fears did not. Results show that those higher in social interaction anxiety consumed more cookies; those higher in impression management consumed fewer cookies.<sup>3</sup> See Table 3.

Results from Study 2 suggest that impression management may boost self-control after social evaluation, which is consistent with findings published by Uziel and Baumeister (2012). An alternate explanation for the impression management findings, however, is that those higher in impression management were more concerned about others' evaluations of them in terms of the number of cookies consumed. Results also show that those higher in social interaction anxiety ate more of a good tasting but unhealthy food after being socially evaluated than those lower in social interaction anxiety. That is, following social evaluation, higher social interaction anxiety was related to less self-control. These results support findings from Study 1 establishing a link between social anxiety and trait self-control and suggest that social anxiety may be predictive of poor behavioral self-control following social evaluation.

A major limitation of Study 2 is that no control group, for which participants did not give a speech, was included. As a result of this limitation, it is possible that individuals higher in social anxiety

3. We examined whether participants' ratings of the cookies influenced the number of cookies they consumed. Due to a data collection error, we only had this data for 54 of our participants. We found that the number of cookies consumed was positively correlated to ratings of taste ( $r = .29$ ,  $p < .05$ ), texture ( $r = .41$ ,  $p < .05$ ), and overall quality ( $r = .30$ ,  $p < .05$ ), but not with smell or how likely participants were to buy a box of the cookies. As a result, we entered taste, texture, and overall quality ratings as covariates into the regression analysis in Step 1. The results, for those 54 participants, were similar to the results obtained without entering those factors into the regression equation.

TABLE 3. Results From Hierarchical Multiple Regression Analysis in Study 2

	$\beta$	$F$	$p$	$R^2$
Step 1		7.43	.008	.09
Impression management	-.30		.008	
Step 2		4.70	.005	.16
Impression management	-.25		.026	
Social interaction anxiety	.30		.043	
Scrutiny fears	-.04		.772	

would have consumed more cookies than those lower in social anxiety without the presence of social evaluation. Another limitation is that we did not assess discounting the positive aspects of the social interaction in Study 2. A third study was therefore conducted that included a control group in order to determine whether social anxiety is generally associated with poorer self-control or whether self-control only suffers after social interaction. Study 3 also assessed whether discounting the benefits of a positive social interaction was related to social anxiety and to behavioral self-control.

### STUDY 3

Study 2 showed that participants higher in social anxiety exhibited less self-control following social evaluation. In Study 3, we wanted to further examine the relationship between social anxiety and behavioral self-control by expanding on Studies 1 and 2. First, Study 3 included a control group, a group that did not engage in social interaction, to determine whether social anxiety is generally related to poorer behavioral self-control or whether this result is only seen after social interaction. Second, rather than expose participants to social evaluation, we wanted to determine whether simply working with a stranger on a task would reduce self-control after the social interaction. Third, we wanted to assess self-control using a task that did not involve food consumption in order to more broadly generalize the findings of our research. Fourth, we wanted to determine whether the findings in Study 2 regarding impression management were due to the type of self-control task used (i.e., eating a desirable but unhealthy food) or whether we would replicate those results using a self-control task that did not involve food consumption. Fi-

nally, we wanted to attempt to replicate our findings from Study 1 regarding discounting the benefits of a positive social interaction in Study 3 as we did not assess discounting in Study 2.

Participants were randomly assigned to either work alone or with a stranger on a task. They then worked alone to complete a task assessing self-control. Our first hypothesis was that participants higher in social anxiety would exhibit less self-control than those lower in social anxiety when working with another person on the initial task, but not when working alone on the initial task. Study 3 also examined perceptions of the social interaction for those participants working with a stranger on the task. Based on the results from Study 1, our second hypothesis was that those higher in social anxiety would discount the benefits of the positive interaction more so than those lower in social anxiety. Our third hypothesis was that discounting would be related to lower behavioral self-control.

## METHOD

### Participants

A total of 141 (91 females) undergraduate students volunteered for the study ( $M_{Age} = 21.81$ ,  $SD = 7.30$ ). Participants were recruited online through the Sona Systems participant management software at their university. They received course credit as compensation for participation in the study.

### Materials and Procedure

After giving informed consent, participants completed the brief Self-Control Scale ( $\alpha = .85$ ) as well as the SIAS ( $\alpha = .92$ ) and the SPS ( $\alpha = .91$ ) as measures of social anxiety (Mattick & Clarke, 1998). Participants also completed the BIDR (Paulhus, 1991) to measure impression management ( $\alpha = .75$ ).

Participants next completed creativity tasks. The creativity tasks specifically served to provide a context for a positive social interaction for those participants assigned to the pair condition. Participants were randomly assigned to complete the tasks either alone ( $n = 70$ ) or with another person (an experimental confederate;  $n = 71$ ). Confederates were undergraduate students who worked for the



primary researcher. For those that were assigned to complete the creativity tasks with another person, gender was matched such that female participants interacted with a female confederate and male participants interacted with a male confederate. Participants first completed the alternate uses task (Guilford, 1967) and were asked to list as many alternative uses as they could think of for a brick and for a donut. They were also asked to list as many problems as they could think of that might emerge if they were able to walk on air or fly without being in an airplane or similar vehicle (Baumeister, Heatherton, & Tice, 1993). Participants were given 10 minutes to work on the creativity tasks. Experimental confederates were instructed to keep the interaction positive (similar to instructions given to experimental confederates in Study 1). They were further instructed and trained on how to handle the interaction. For instance, confederates were told to work collaboratively with participants on the task, providing some answers for each task. If a participant was reluctant to help provide answers for the creativity task, confederates were instructed to politely prompt participants for responses (e.g., "Do you have any ideas?" "What do you think?").

After completing the creativity tasks, participants who worked with an experimental confederate on the tasks completed the assessment of discounting that was used in Study 1 ( $\alpha = .77$ ). Higher scores were indicative of more discounting of the positive social interaction. All participants were then given a puzzle to solve alone. Their task was to draw as many lines as were needed to subdivide an obtuse triangle into smaller acute triangles. Participants were told they could work on the puzzle for as long as they wanted. In unpublished studies conducted by Edlund, not one participant out of more than 2,000 had correctly solved the puzzle in the time allotted for the task (J. Edlund, personal communication, July 11, 2013). Participants were given up to 20 minutes to work on the puzzle. The length of time (in seconds) that participants persisted in attempting to solve the puzzle served as a measure of self-control. Persistence on a difficult or unsolvable task is a commonly used measure of self-control (e.g., Baumeister, Bratslavsky, Muravan, & Tice, 1998; Baumeister et al., 2005; Vohs, Baumeister, Schmeichel, Twenge, Nelson, & Tice, 2008). Participants next completed a demographics questionnaire and a funnel debriefing procedure before exiting the lab.

**TABLE 4. Zero-Order Correlation Coefficients, Means, and Standard Deviations for Study 3**

	1	2	3	4	5	6
1. Trait self-control	–					
2. Social interaction anxiety	– 0.13	–				
3. Scrutiny fears	– 0.05	0.76*	–			
4. Impression management	0.03	0.01	0.08	–		
5. Discounting	– 0.03	0.37*	0.23	– 0.12	–	
6. Persistence (in seconds)	0.04	0.05	– 0.01	0.04	– 0.17	–
Mean	44.02	22.47	17.89	82.79	16.65	617.96
Standard Deviation	8.44	13.19	12.47	16.00	6.29	348.54

Note. \* $p < .05$

## RESULTS AND DISCUSSION

We first examined all variables for skewness and kurtosis. Because social interaction anxiety and scrutiny fears were positively skewed, we conducted square root transformations on both variables. We next examined the correlations between trait self-control and social anxiety. Unlike in Studies 1 and 2, we did not find significant correlations between trait self-control and social interaction anxiety or scrutiny fears. See Table 4 for all zero-order correlation coefficients.

To test our first hypothesis, two regression analyses were conducted entering experimental condition (alone or pair, dummy coded), reported social anxiety (social interaction anxiety or scrutiny fears), and the interaction term to predict persistence on the puzzle task (in seconds). Neither the main effects nor the interaction were significant when social interaction anxiety was included in the regression equation. When entering scrutiny fears into the regression, however, there was a significant main effect for the experimental condition,  $\beta = 0.41$ ,  $t = 2.50$ ,  $p = .014$  ( $B = 282.74$ ,  $SE_B = 113.08$ , 95%  $CI = 59.13, 506.35$ ), and a significant interaction between experimental condition and scrutiny fears,  $\beta = -0.41$ ,  $t = -2.47$ ,  $p = .015$  ( $B = -13.88$ ,  $SE_B = 5.61$ , 95%  $CI = -24.98, -2.78$ ) (the main effect for scrutiny fears was nonsignificant). A simple slopes analysis revealed that when participants were in the alone condition, scrutiny fears did not influence persistence on the puzzle task (slope gradient = 2.87, *ns*). When in the pair condition, however, those higher in scrutiny fears persisted for less time on the puzzle task (slope gradient = -11.02,  $t = -2.23$ ,  $p = .027$ ), demonstrating lower self-control (see Figure 1).

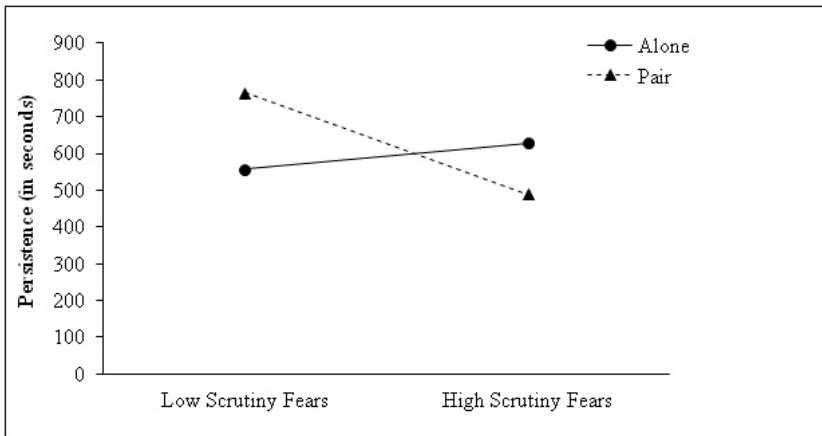


FIGURE 1. Simple slopes analysis for the interaction between experimental condition (alone vs. pair) and scrutiny fears (from the Social Phobia Scale) on persistence on the puzzle task for Study 3. Low scrutiny fears is one standard deviation below the mean; high scrutiny fears is one standard deviation above the mean. The simple slope for those in the Pair condition is statistically significant,  $p = .027$ .

These results support our first hypothesis showing that when interacting with another person, social anxiety (specifically, scrutiny fears) is associated with exhibiting poorer self-control as demonstrated by persisting for less time on the puzzle task.

To test our second hypothesis, we examined the relationship between social anxiety and discounting the benefits of a positive social interaction for those 71 participants that completed the creativity task with an experimental confederate. Results supported the second hypothesis, showing that social interaction anxiety was significantly related to greater discounting,  $r = -.37$ ,  $p = .002$ . Scrutiny fears was also related to greater discounting, though this correlation was not statistically significant,  $r = -.23$ ,  $p = .057$ . Discounting was not significantly correlated with persistence on the puzzle task. As a result, our third hypothesis was not supported (see Table 4).

Impression management was not significantly correlated with social anxiety or with persistence on the puzzle task. When impression management was entered into the regression analyses conducted above to control for the variable, the results remained unchanged. As a result, the result found in Study 2 showing that impression management significantly predicted behavioral self-control was not replicated in Study 3. This provides support for the idea that those higher in impression management were more concerned about

others' evaluations of them in terms of the number of cookies consumed in Study 2 and that these concerns did not translate to participants' persistence on the puzzle task in Study 3.

A key limitation to Study 3 is that although experimental confederates were trained in how to interact with participants during the creativity task, and to keep interactions as consistent as possible during their interactions with participants, it is possible that individuals with social anxiety may have elicited different behaviors from the confederates than participants low in social anxiety. This is a limitation of Study 1 as well. This may partially explain the results obtained in Studies 1 and 3 and will be discussed further in the General Discussion. Unfortunately, because video recordings of the interactions between participants and confederates were not retained, we are unable to code the behaviors of the confederates and participants to know whether socially anxious participants did indeed influence the behaviors of the confederates. Future studies will need to address this limitation.

## GENERAL DISCUSSION

These results supported most of our predictions and are largely consistent with prior research. The results of the current research provide evidence that higher social anxiety is related to lower self-control. Specifically, Study 1 showed a negative relationship between social anxiety and general (trait) self-control. Study 2 found that after social evaluation, socially anxious individuals displayed less self-control than less socially anxious participants by eating more of a good tasting yet unhealthy food. Finally, Study 3 revealed that after completing a task with another person, social anxiety predicted poorer self-control. This relationship was not present when socially anxious individuals completed the prior task alone, thereby highlighting the impact of the interaction. The results of our studies also support previous research showing that social anxiety is related to greater discounting of the benefits of a positive social interaction (Vassilopoulos & Banerjee, 2010) and that discounting is related to less trait self-control (Study 1) and less behavioral self-control (Study 3). Discounting was not related to trait self-control in Study 3, however.

An interesting yet somewhat puzzling finding from the present research is that in Study 2, it was social interaction anxiety that pre-

dicted poorer self-control, whereas in Study 3, it was scrutiny fears, not social interaction anxiety, that predicted worse self-control. One possible explanation may lie in the difference between the types of social interactions in the two studies. In Study 2, participants were socially evaluated while giving a 5-minute speech in which they had to talk about themselves in a positive way. In Study 3, however, participants were simply interacting with another person while completing a creativity task. It is possible that different subtypes of social anxiety may be better predictors of self-control depletion within different social contexts. For example, scrutiny fears may have been more relevant in the situation where participants were concerned about contributing to the success of the task than in a situation where they were presenting themselves to others. Future research will need to examine this possibility.

Another puzzling result is that the link we found between social anxiety and trait self-control in Studies 1 and 2 was not present in Study 3. In fact, we found that trait self-control was not only significantly related to social interaction anxiety and to scrutiny fears in Studies 1 and 2, but also found that trait self-control was related to social anxiety using another measure of social anxiety (the Liebowitz Social Anxiety Scale) in Study 1 and in another unpublished study conducted in our lab (refer to Footnote 1). As a result, it is not clear why those results were not replicated in Study 3. It may be important to note that when we combined data from all three samples<sup>4</sup> ( $n = 334$ ), we found a significant correlation between social interaction anxiety and trait self-control,  $r = -.19, p < .001$ , and a significant correlation between scrutiny fears and trait self-control,  $r = -.19, p = .001$ . Additionally, in another study we recently completed in the lab ( $n = 408, M_{Age} = 20.94, SD = 5.62, 59\%$  females), we also found a significant correlation between social anxiety and self-control (for social interaction anxiety,  $r = -0.37, p < .001$ ; for scrutiny fears,  $r = -0.29, p < .001$ ). This suggests that the lack of significant results found in Study 3 may simply be due to chance. Because it is not apparent why the relationship between social anxiety and trait self-control was not replicated in Study 3, however, future research should attempt to replicate these results using other samples of participants.

There are several limitations to the current research that should be noted. First, although we examined the relationship between

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4. We would like to thank an anonymous reviewer for this suggestion.

social anxiety and trait self-control as well as behavioral self-control, social anxiety was examined as a trait. As a result, it cannot be concluded that social anxiety causes self-control depletion. Second, behavioral self-control was assessed by persistence on a difficult task and resisting eating too much of an unhealthy yet good tasting food. Future research should examine how social anxiety is related to behavioral self-control in other domains of self-control using different self-control tasks. For instance, a meta-analysis by de Ridder, Lensvelt-Mulders, Finkenauer, Stok, and Baumeister (2012) identified nine different domains that rely on self-control. These include (1) school/work achievement, (2) eating/weight-related behavior, (3) sexual behavior, (4) addictive behavior, (5) interpersonal functioning, (6) emotion regulation, (7) well-being and adjustment, (8) deviant behavior, and (9) planning and decision making. Examining self-control in domains other than eating and persistence would provide a greater understanding of the influence of social anxiety on self-control following social interaction.

Perhaps the biggest limitation of the present research is the fact that confederates' behaviors were not video recorded and coded when interacting with participants in Studies 1 and 3. This is problematic as there may have been systematic differences in how confederates interacted with, and behaved toward, high and low socially anxious participants, presenting a possible confound to our results. For instance, prior research has shown that those with social anxiety tend to be perceived more negatively during social interactions than those lower in social anxiety (e.g., Alden & Wallace, 1995; Creed & Funder, 1998; Meleshko & Alden, 1993; Pilkonis, 1997; Voncken, Alden, Bögels, & Roelofs, 2008; for an exception, see Segrin & Kinney, 1995) and this seems to be driven by poor social performance (Voncken et al., 2008). These results are supported by Mallott et al. (2009) who found that socially anxious individuals exhibited poorer eye contact and vocal quality during an interaction with a new partner after social rejection than non-socially anxious individuals. As a result, the poor social performance of highly socially anxious participants may elicit negative social cues (which may have been automatic/unconscious) from the confederates, leading to negative (yet accurate) interpretations from participants about the social interactions. This may explain why socially anxious participants engaged in more discounting of the social interactions in Studies 1 and 3. As a result, future research should code any interactions participants have with either confederates or with

other participants to assess for this possibility. In addition, it may be beneficial for future research to examine whether others perceive socially anxious individuals who show greater decrements in self-control more negatively.

Despite these limitations, there is value to the current research as (1) it replicated previous research showing a link between social anxiety and self-control, (2) it established a link between social anxiety and measures of behavioral self-control, and (3) it showed that this relationship is primarily present after a social interaction, even when the participant is not being explicitly socially evaluated. The current research also replicated previous research showing a link between social anxiety and discounting the benefits of a positive social interaction and established a link between discounting and self-control.

There are many directions that future research can pursue on this topic as this is a relatively new area of investigation. Not only should future research further examine the link between social anxiety and self-control; it would also be beneficial to examine the mechanisms by which social anxiety leads to reduced self-control during or following social interaction. The research conducted by Kashdan and his colleagues (2013) suggests that experiential avoidance may be one such mechanism by which social anxiety reduces self-control in social situations. Experiential avoidance is defined as attempts to avoid, escape from, or conceal disagreeable thoughts and emotions (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Kashdan et al. (2013), found that experiential avoidance distinguished individuals with SAD from healthy controls. That is, those with SAD were significantly more likely to engage in experiential avoidance during social interactions than were healthy control participants. These attempts at concealing or avoiding anxious thoughts and feelings may deplete self-control resources and thus may interfere with the ability to engage in self-control (Kashdan et al., 2013).

Other possible mechanisms explaining the relationship between social anxiety and self-control may include how attention is allocated during and/or after social interaction, motivation to engage in self-control during or after social interaction, and possibly mental rumination. Several studies have shown that socially anxious individuals are likely to engage in excessive and persistent rumination (e.g., Chen et al., 2013; Fehm, Schneider, & Hoyer, 2007; Jose, Wilkins,



& Spendelow, 2012; Kocovski & Rector, 2007; McEvoy & Kingsep, 2006; Nepon, Flett, Hewitt, & Molnar, 2011; Rachman, Gruter-Andrew, & Shafran, 2000; Vassilopoulos, 2004). Those higher in social anxiety may be prone to ruminate about negative aspects of their interactions with others and on their perceived social failures (Clark & Wells, 1995). As with experiential avoidance, rumination about a social encounter may deplete self-control resources.

## CONCLUSION

The present research shows that social anxiety is related to lower trait self-control and to poorer behavioral self-control following social interaction. These results imply that socially anxious individuals may be at an increased risk of having poorer relationships with others, of experiencing social rejection by others, of engaging in poor decision-making, and of possibly engaging in impulsive behaviors due to decrements in self-control following social interaction (e.g., Baumeister, 1998). For instance, following difficult social interactions, socially anxious individuals may perform more poorly in their schoolwork or on job-related tasks. Within social situations, they may engage in behaviors that are less than desirable or that are socially inappropriate, leading to negative perceptions by others. Poor self-control may also lead to an exacerbation of social anxiety symptoms for socially anxious individuals, as well as increase susceptibility to developing other psychological problems (Kashdan et al., 2011). As a result, it is important for future research to further understand the relationship between social anxiety and self-control, including the mechanisms explaining this relationship. It will also be important to examine how reduced self-control during and after social interactions for socially anxious individuals influences social perceptions of others, behavior in social situations, and symptoms of social anxiety and other psychological disorders. Furthermore, further research on this topic may influence future efforts to help socially anxious individuals practice improving self-control in social situations within therapeutic settings.

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