

Directed Abstraction: Encouraging broad, personal generalizations following a success
experience

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People with negative self-views may fail to generalize appropriately from success experiences (e.g., Wood et al., 2005). We drew on theories regarding self-views (Swann et al., 1987) and abstraction (Semin & Fiedler, 1991), as well as past linguistic framing work (e.g., Marigold, Holmes, & Ross, 2007, 2010; Salancik, 1974), to create a new technique to encourage people with negative self-views to generalize broadly from a success experience to the self-concept. We call this technique *directed abstraction*. In Experiment 1, participants with negative self-views who completed a directed abstraction writing task following success feedback regarding a novel laboratory task generalized more from that success, reporting higher ability levels and greater expectations of future success in the relevant domain. In Experiment 2, directed abstraction produced similar results (including more positive self-related affect, e.g., pride) after participants recalled a past public speaking success. In Experiment 3, participants high in fear of public speaking gave two speeches in a context designed to be challenging yet also to elicit successful performances. Directed abstraction helped these participants generalize from their success to beliefs about their abilities, expectations about the future, and confidence as a speaker. In Experiment 4, directed abstraction following success on a verbal task increased persistence in the face of failure on a subsequent verbal task. We discuss implications for understanding how and when people generalize from a success, compare directed abstraction to existing interventions, and suggest practical applications for this influence technique.

Sometimes people who have every reason to believe in their abilities instead doubt themselves. Even in the face of a clear success, these individuals fail to infer the existence of an underlying ability or skill. For example, imagine that James, a graduate student who believes he is a terrible lecturer, performs very well when asked to give a guest lecture in a course his advisor is teaching. Despite his advisor's glowing praise after the lecture, imagine that James discounts his success and continues to believe he is bad at lecturing. Failing to generalize from his initial success to more positive beliefs about his abilities might lead James to avoid future teaching assignments, become overly anxious when he is required to teach again, and eventually even flee academia. On the other hand, if he were only to take his success to heart and revise his self-views upward, James might find lecturing quite rewarding and eventually enjoy a long teaching career. How might someone like James be encouraged to generalize from a success experience to a personal ability? The current research suggests that a directed abstraction writing exercise can help people make such generalizations.

There are many situations in which it would be adaptive to encourage self-concept change (i.e., change in one's beliefs about oneself) following a success. Public speaking is an excellent example. Speakers who present a calm outward demeanor but are nonetheless anxious may mistakenly believe that their anxiety is painfully obvious to their audience, leading them to resist labeling their performance as a success (Gilovich & Savitsky, 1999; Harvey, Clark, Ehlers, & Rapee, 2000). Even if such speakers believe they were successful, their internal experience of anxiety while speaking may lead them to resist the conclusion that they are good public speakers, resulting in continued avoidance of public speaking (and thus fewer opportunities to receive further corrective success feedback) and continued anxiety. These maladaptive processes may

lead to even poorer speech performance (Rapee & Heimberg, 1997; Wild, Clark, Ehlers, & McManus, 2008).

Thus, failing to conclude that one has an underlying ability following a success can perpetuate a negative self-reinforcing cycle in which negative self-beliefs play a key role. In the public speaking domain, it is fairly obvious how the false belief that one is a bad public speaker could perpetuate itself via increased anxiety, but other more general mechanisms such as avoidance or self-handicapping (Tice & Baumeister, 1990) could create such negative self-reinforcing cycles in virtually any performance domain. Success experiences may represent critical turning points in such cycles, at which an individual with negative self-views might either continue to persist in those negative self-beliefs, or, instead, conclude that he or she possesses at least moderate levels of an ability, a belief that could redirect these vicious cycles into more positive, adaptive directions.

Our goal is neither to define the conditions that lead people to construe an event as a success, nor to map out exactly when it is adaptive or maladaptive to generalize broadly from that success. Rather, we wish, first, to clarify whether there are situations in which individuals with negative self-views sometimes persist in those views despite clear evidence of their competence, and second, to develop a social influence technique to redirect those individuals at these critical turning points toward more positive views of their abilities and greater expectations of future success, with the hope that such generalizations will lead to other important outcomes (e.g., affective responses, persistence on difficult tasks). Of course, such a technique will be useless in the absence of evidence of a personal ability (i.e., following failure). Nor would it be desirable to convince people they are good at something if that conclusion is unjustified. Instead, this technique will be useful in any situation in which a person with inaccurately negative self-

views rejects clear evidence of having performed at a higher level than is consistent with those self-views, or accepts the evidence but rejects revising those self-views upward.

Self-views and reactions to success

Social psychologists have long been interested in how self-views bias reactions to success and failure. Many researchers have approached the question from a consistency viewpoint, arguing that people with overall positive self-views readily accept success feedback but discount failure, whereas people with overall negative self-views are quick to accept failure feedback but discount success (Brockner, 1979; Brown & Dutton, 1995; Shrauger & Rosenberg, 1970). In other words, people are motivated to verify their existing self-views, whether positive or negative, and if the self-view in question is negative, people may reject positive information about themselves (Swann, 1983; Kwang & Swann, 2010). Besides establishing self-verification as an important motivation, theorists also attempted to reconcile the self-verification motive with the self-enhancement motive, proposing that while cognitive reactions to success and failure (i.e., perceptions of the accuracy of a test, or attributions about one's performance) depend on self-verification motives, affective reactions depend instead on self-enhancement motives (i.e., everyone, regardless of self-views, experiences positive emotions following success and negative emotions following failure; Jussim, Yen, & Aiello, 1995; Shrauger, 1975; Swann, Griffin, Predmore, & Gaines, 1987). Swann and his colleagues (1987) called these competing motives a "cognitive-affective crossfire," suggesting that people with negative self-views who receive positive feedback experience conflict between immediate positive feelings on the one hand, and negative thoughts (e.g., doubting the accuracy of the feedback) on the other.

Although self-verification theory makes clear predictions regarding reactions to both success and failure, far more research has focused on failure than on success. One reason for this

disparity is that some early research produced more reliable self-esteem differences in reactions to failure than to success (Baumeister & Tice, 1985; Brockner, 1979; Fitch, 1970). These early failures to find statistically reliable effects of self-esteem following success, coupled with large, significant effects following failure, may have led subsequent researchers to direct their efforts toward the study of failure, treating success conditions as merely control conditions. Theoretical perspectives may also have guided researchers toward the study of failure rather than success. Some researchers may have assumed that the self-enhancement motive, or the desire to achieve positive self-images (e.g., Sedikides & Strube, 1997; Taylor & Brown, 1988), is so strong that all people draw positive conclusions about themselves following a success; others may simply have been more interested in how these motives lead people to defensively discount negative information about themselves (e.g., Kunda, 1990). Additionally, clinical theorists such as Beck (1967) argued that overgeneralization from negative life events is a major component of depression, a perspective that influenced clinically-oriented researchers (e.g., Kernis, Brockner, & Frankel, 1989). So for theoretical reasons as well as empirical ones, an explicit focus on reactions to success has been relatively rare in the literature.

Research that does explicitly address reactions to success has generally found that people with negative self-views have problems generalizing from a success experience to the self-concept. For example, participants low in self-esteem who receive success feedback tend not to show the same gains as participants high in self-esteem on outcomes such as self-rated ability, expectations of future performance, and actual future performance, at least in part because those low in self-esteem view success feedback as inaccurate or make external attributions for their performances (Jussim et al., 1995; Shrauger & Rosenberg, 1970; Wood, Heimpel, Newby-Clark, & Ross, 2005). Furthermore, participants with negative self-views in a particular domain tend to

regard their performance in that domain more negatively, regardless of success feedback (Critcher & Dunning, 2009), and they may be less motivated by success than participants high in self-esteem (Kernis et al., 1989). Finally, despite the fact that theory often predicts self-esteem differences in cognitive but not affective responses to success (e.g., Jussim et al., 1995; Shrauger, 1975; Swann et al., 1987), at least some research has found that participants low in self-esteem experience more negative and less positive affect following a success than those high in self-esteem (Wood et al., 2005).

In sum, past research suggests that people with negative self-views (sometimes domain-specific, but often general low self-esteem) do not fully benefit from success experiences, failing to make the same positive cognitive inferences about their performance and their abilities that people with positive self-views do. The evidence is less overwhelming for other outcomes, but people with negative self-views may experience more negative and fewer positive emotions, be less motivated on future tasks, and actually perform worse on future tasks than people with positive self-views following a success experience.

Does generalizing from a success matter?

In support of our assertion that generalizing from a success to the self-concept is important, many of the variables described above have also been studied not as outcomes following a success, but as independent predictors of yet other important outcomes. Beliefs about one's ability are consequential. For example, schoolchildren who believe they are good at a particular subject subsequently earn higher grades in that subject, even controlling for their prior performance (Marsh, 1990). Similar effects of ability beliefs on performance have been found in other domains, such as gymnastics and swimming (Marsh, Chanal, & Sarrazin, 2006; see Marsh & Craven, 2006, for a review). Moving beyond ability beliefs, research shows that expectations

of performing well on a task (i.e., self-efficacy; Bandura, 1986) predict actual performance in a variety of domains, including general cognitive tests (Paunonen & Hong, 2010), teaching (Klassen & Tze, 2014), and bowling (Boyce & Bingham, 1997). Interestingly, these effects of expectancies on performance may be especially pronounced for difficult rather than easy tasks (Marshall & Brown, 2004), which might be at least partially explained by the fact that, under certain conditions, people with positive self-views persist more in the face of failure than those with negative self-views (Di Paula & Campbell, 2002; Sandelands, Brockner, & Glynn, 1988).

More clinically-oriented research also supports the view that generalization from a success matters. For example, in one study that focused on the problem of undergeneralization of positive experiences, participants who met clinical criteria for social anxiety disorder underwent a single session of exposure treatment for fear of public speaking, culminating in a successful speech performance. Despite this success, participants who still exhibited negative attitudes toward public speaking on an implicit measure were more likely to experience return of fear in a follow-up session one month later (Vasey, Harbaugh, Buffington, Jones, & Fazio, 2012). More germane to the question of generalization to the self, Goldin and colleagues (2013) found that cognitive-behavioral therapy led to increases in positive self-views, as measured by endorsement of positive traits as self-descriptive, for individuals with social anxiety disorder. These increases in positive self-views (but not decreases in negative self-views) mediated reductions in social anxiety symptoms up to a year following treatment. So, across a variety of domains, and including research from quite different theoretical traditions, there is considerable evidence that generalization from a success can yield positive outcomes. Thus it would appear beneficial to encourage people who otherwise would fail to generalize to overcome their self-doubts and generalize from a success experience to the self.

Linguistic abstraction and framing techniques

Besides simply identifying maladaptive processes, social psychology has a strong track record of designing and testing theory-based interventions to redirect those maladaptive processes in more functional directions (e.g., Fazio, 1990; Ruble, Costanzo, & Oliveri, 1992). The best of these “wise psychological interventions” (Walton, 2014) precisely target psychological mechanisms that play critical roles in recursive processes, resulting in self-reinforcing, cascading benefits. Many such interventions are brief but powerful writing exercises that guide individuals toward more adaptive construals of ambiguous situations (e.g., Cohen, Garcia, Apfel, & Master, 2006; Marigold, Holmes, & Ross, 2007, 2010; Sherman et al., 2013; Walton & Cohen, 2011; Wilson & Linville, 1985; see Wilson, 2011, for a review). With this tradition in mind, we will first review previous research on linguistic framing and then propose a new linguistic framing technique to help people with negative self-views draw more positive conclusions about themselves and their abilities following a personal success.

Different types of language have different implications, and word choice can indicate whether or not it is appropriate to generalize beyond a particular concrete event to a more abstract conclusion. For example, the phrases “Ira gave Georgia five dollars”, “Ira helped Georgia”, “Ira likes Georgia”, and “Ira is generous” could all be used to describe the same event, yet each suggest different conclusions about the actors and the meaning of the action. Semin and Fiedler’s Linguistic Category Model (1988, 1991; cf. Trope & Liberman, 2010; Vallacher & Wegner, 1987) proposed that interpersonal actions can be described at four different levels of abstraction, ordered here from concrete to abstract: descriptive action verbs (“gave”), interpretive action verbs (“helped”), state verbs (“liked”), and adjectives (“generous”). As the language used to describe an event becomes more abstract, one can make broader generalizations across time,

situations, and people. In the above example, the concrete “Ira gave Georgia five dollars” makes no assumptions about Ira, his relationship to Georgia, or likely future behaviors, whereas the abstract “Ira is generous” suggests an enduring trait that has broad implications for Ira’s future interactions with Georgia and with others. Using abstract language to ask questions about an event (DePoot & Semin, 1995; Semin, Rubini, & Fiedler, 1995) or when describing an event (Semin & Fiedler, 1989; Wigboldus, Semin, & Spears, 2000, 2006) can communicate much more than the concrete details of what actually occurred, biasing participants’ interpretations markedly.

Recent work also suggests that nouns imply especially enduring, stable tendencies, and, as such, can have powerful effects on the self-concept. For example, participants who complete noun statements regarding their preferences (e.g., “I am a baseball fan”) infer that those preferences are stronger than participants who complete verb statements (e.g., “I watch baseball a lot”; Walton & Banaji, 2004). In another study, completing a survey on voting that used nouns rather than verbs (e.g., rating the importance of “being a voter” rather than “voting”) increased not only intentions to vote, but also actual voting behavior (Bryan, Walton, Rogers, & Dweck, 2011). Of course, this recent work on nouns as self-labels is part of a larger body of work on verbal labeling more generally. In one classic study, participants who watched a video of a car crash later estimated the cars were going almost 10 mph faster if asked about the speed when the cars “smashed into” rather than “contacted” each other (Loftus & Palmer, 1974). This research suggests that verbal labels are a powerful method of shaping how people construe events, and nouns seem especially potent in altering people’s beliefs about themselves.

Another approach to linguistic framing is to word questions in ways that make specific information salient. For example, Salancik (1976) constructed questionnaires designed to make

salient different motivations for past behaviors, which affected subsequent attitudinal responses. Question wording can also induce participants to either agree or disagree with the majority of items on a questionnaire, affecting participants' self-perceptions (Salancik & Conway, 1975). In one particularly interesting manipulation, participants explained why they performed behaviors using either "because I..." or "in order to..." sentence stems, which made different motivations salient and affected later judgments regarding the behaviors (Salancik, 1974). These methods, especially Salancik's (1974) sentence stem completion task, represent a promising strategy for focusing participants on certain types of explanations for a success.

One previous line of research stands out for drawing heavily on some of the above work to create an intervention for people with low self-esteem in romantic relationships (Marigold, Holmes, & Ross, 2007, 2010). People with low self-esteem have trouble perceiving that their relationship partners regard them positively, leading to such negative outcomes as reduced relationship satisfaction and decreased regard for the partner (e.g., Murray, Holmes, Griffin, Bellavia, & Rose, 2001). Reasoning that these effects occur because people with low self-esteem fail to generalize from positive relationship events, Marigold and her colleagues (2007) designed a writing manipulation in which participants first recalled a compliment from their romantic partner and then either responded to a prompt beginning with "Explain why your partner admired you," or described the concrete details of the event (control condition). This manipulation was multi-pronged: "Explain why" should induce an abstract mindset conducive to generalization (Freitas, Gollwitzer, & Trope, 2004), while "admired" both presupposes that the compliment was indicative of positive regard and, being a state verb (Semin & Fiedler, 1988, 1991), connotes that the positive regard represented a stable pattern rather than an isolated event. This manipulation greatly benefited participants low in self-esteem, increasing felt security, value placed on the

relationship, state self-esteem, and even positive relationship behaviors as reported by the partner several weeks later (Marigold, Holmes, & Ross, 2007, 2010). The way in which this research drew on different linguistic framing principles to create a powerful intervention was one of the primary inspirations for the current work.

The Current Research

We had three main goals for this research. First, we wanted to explore whether negative self-views prevent people from generalizing from success experiences to the self-concept. While much previous theory and research within the general self-verification framework suggests such effects should occur (Shrauger & Rosenberg, 1970; Wood et al., 2005), some studies have produced ambiguous results (e.g., clearer effects for failure than for success; Brown & Dutton, 1995). Moreover, other influential theories offer a competing prediction. Self-enhancement theory might suggest that the drive to attain more positive self-views would lead most, if not all, participants to seize the opportunity to think well of themselves that a success experience provides (e.g., Sedikides & Strube, 1997; Taylor & Brown, 1988). Similarly, self-assessment theory might suggest that the motive to achieve accurate self-knowledge would likewise cause participants to generalize from a credible success experience to the self-concept (Trope, 1986). Thus, finding a self-verification effect rather than a self-enhancement or self-assessment effect in a control condition would help clarify some confusion that exists in the literature. Second, and most importantly, we wanted to develop a writing intervention to overcome this self-verification process in which people with negative self-views fail to draw conclusions about their abilities following a success. We drew on a variety of linguistic framing techniques, including focusing participants on *why* they succeeded (Freitas et al., 2004), choosing abstract verbs that imply a stable ability (Semin & Fiedler, 1988, 1991), presupposing that participants were responsible for

the success, and using a sentence stem to constrain participants' responses (Salancik, 1974).

Although Marigold and her colleagues (2007, 2010) used some (but not all) of these techniques, their manipulation narrowly targeted generalization regarding a compliment in the specific context of romantic relationships. Our goal, on the other hand, was to create an intervention that could be used, with minor adjustments, following a success in any domain.

Regarding this goal of creating an intervention, we hoped to make not only a practical contribution, but also a theoretical one. If our directed abstraction writing task were to help people with negative self-views generalize from a success to the self-concept, it would show that self-verification is not inevitable in these situations. Rather, if this undergeneralization could be prevented by a well-conceived linguistic framing intervention in which participants are led to self-generate ability explanations for their success, we might gain a clearer understanding of when self-views do and do not bias people's reactions to success, and exactly what processes are sufficient to produce generalization in these contexts.

In addition, we wanted to test whether the impact of such an intervention might extend beyond self-views to actual behavioral outcomes, in particular persistence in the face of failure. In this context, when competence in a domain is directly threatened by failure, we surmised that benefits from the intervention might be evident not just for people with initially negative self-views, but also for a wider range of participants. That is, if a linguistic intervention can help people with chronic negative self-views overcome the self-doubts that are paradoxically activated by success, might the same intervention also help people, regardless of their chronic self-views, overcome the acute momentary self-doubts that are activated by failure? Such a finding would demonstrate the wide utility of our intervention as an antidote to maladaptive

negative beliefs about one's abilities, not just in the case of self-verification, but also when the negative beliefs in question are more momentarily induced by a challenging situation.

In pursuing these goals, we used a variety of methods and samples to maximize the generalizability of our results. We first developed and tested the directed abstraction manipulation and generalization measures in a tightly controlled success experience engineered in the lab (Experiment 1). Then, we modified and tested those methods in the context of online participants recalling a public speaking success (Experiment 2). Next, we returned to the lab to create a more intense and realistic success, recruiting participants with negative self-views regarding public speaking to give a series of short speeches in the lab (Experiment 3). And finally, we created a lab paradigm that would allow us to measure an important behavioral outcome: persistence in the face of failure (Experiment 4).

Our first hypothesis was that, in our control conditions, participants with negative self-views would generalize less from a success experience than participants with positive self-views, confirming self-verification predictions (Experiments 1 and 2). Our second hypothesis was that directed abstraction would help participants with negative self-views generalize from their success, relative to control participants with negative self-views (Experiments 1, 2, and 3). Our third and final hypothesis was that directed abstraction following a success experience would have behavioral consequences, specifically, increased persistence in the face of failure on an exceptionally difficult task; and, given that intense failure should induce self-doubt not just for participants with negative self-views, but also for those with positive self-views, we were open to the possibility that directed abstraction would have effects in such a situation regardless of participants' initial self-views (Experiment 4).

Experiment 1

Our first goal was to develop and test our hypotheses regarding self-views, reactions to success, and the directed abstraction intervention in a controlled lab setting. In order to achieve the greatest amount of experimental control possible, we created a standardized success experience in which all participants received equally positive feedback about their performance. Additionally, we designed the task around a fabricated, and thus novel, ability domain, in order to avoid a situation in which participants had such firmly established beliefs about their abilities that we would be unable to detect self-concept change following the success. Participants completed the task, received success feedback, and then completed either a directed abstraction or a control writing exercise. Then, participants rated their ability in the domain in which they had succeeded and predicted how well they would do on future tasks requiring this ability.

Method

Participants

Ninety-one native English-speakers participated for credit in an introductory psychology course. Because the study relied on false feedback, we excluded from analysis five participants who expressed clear suspicion of the success feedback during a computerized funnel debriefing. The final sample included 86 participants (52 women, 34 men).

Overview of Procedure

Participants first completed a measure of self-competence (SC) during a departmental mass-testing session at the beginning of the semester. Then, as part of a study they were led to believe was about “Intuitive Perception and Estimation Ability,” participants took a test purported to measure this ability, received success feedback, completed either the directed abstraction writing task or a control (concrete) writing task, and then completed several scales, including a Future Performance scale (measuring how well participants thought they would do

on future tasks involving the same intuitive estimation ability) and an Ability scale (measuring the degree to which participants believed they possessed high levels of Intuitive Perception and Estimation Ability). Participants then underwent a computerized funnel debriefing, in which they were asked increasingly specific questions to probe for suspicion about the success feedback and the purpose of the study, before being fully debriefed.

Self-competence

To measure participants' overall views of their abilities, we administered the self-competence (SC) subscale of the Self-Liking/Self-Competence Scale – Revised (Tafarodi & Swann, 2001) during an online mass testing session prior to inviting participants to take part in the rest of the study. Self-competence is theorized to be a component of self-esteem that represents one's evaluation of oneself as competent and efficacious, in contrast to self-liking, which is a more pure evaluation of the self as good or bad, worthy or unworthy (Tafarodi & Swann, 2001). The construct of self-competence fit our needs well, given that we were more interested in participants' general beliefs about their abilities rather than their content-free evaluative reactions to themselves (see Swann, Chang-Schneider, & McClarty, 2007, for an argument in favor of this kind of specificity-matching in self-concept research). Pilot testing also indicated that the SC scale was a better identifier of participants most likely to benefit from our manipulation than a more general self-esteem measure. Participants responded to the eight items ($\alpha = .79$; e.g., "I am highly effective at the things I do") on a scale from 1 (strongly disagree) to 5 (strongly agree).

Success feedback

Upon their arrival, participants learned that the study was about characteristics of people with varying levels of Intuitive Perception and Estimation Ability, the ability to quickly and

accurately perceive stimuli and make snap, intuitive judgments about those stimuli, especially regarding quantity. Participants were asked to rely on their intuition during the ability test and to respond quickly, and to minimize possible effects of prior self-knowledge or gender stereotypes, were told that performance on this test was unrelated to math skills or to gender. On each of 20 trials, participants saw a fixation point for 1 second followed by between 50 and 150 yellow dots displayed on a blue background (stimuli based on materials from McCaslin, Petty, & Wegener, 2010, and Tajfel, Billig, Bundy, & Flament, 1971). After 3 seconds, the dots disappeared and were replaced by a target number, which varied between trials, and participants had to judge whether there were more or fewer dots than the target number.

After 20 trials, a brief “loading” screen appeared for several seconds (as if a score was being calculated), followed by the text: “Score: 16/20; Percentile ranking: 92nd; Class: Very High”. To enhance the impact and believability of the feedback, at the beginning of the study the experimenter asked participants to write down their score, when they received it, on a scrap sheet of paper on their desk, explaining that we had been having problems with the test program recording participants’ scores, and that when the test program ended participants would then enter their score as part of the following questionnaire program. Prior to each experimental session we wrote down the same four scores, in four different handwriting styles, on each sheet, as if four previous participants had used each scrap sheet of paper. These scores were all lower than the score participants received. After participants wrote down their score on this sheet and clicked the “continue” button, the computer appeared to switch to a new program, and participants were asked to enter their scores. This somewhat complicated procedure accomplished two objectives. First, it increased the impact of the feedback by reinforcing the idea that participants’ scores were much better than average, given that the score was seemingly

higher than the scores of four previous participants (in pilot testing, before instituting this procedure, some participants failed to understand their 92% percentile ranking and thought that 16/20 was a low score). Second, it made the success feedback more believable. We designed the Intuitive Perception and Estimation Ability test to be devoid of any success or failure cues so that participants who performed poorly would believe they had succeeded when they saw their score, but the result was that too many pilot participants suspected the feedback was unrelated to their performance (i.e., that we gave everyone high scores). When we included the sheet with the four other participants' alleged scores, all different from one another and all lower than the participant's score, suspicion rates decreased substantially (to just 5%).

Directed abstraction manipulation

After entering their scores on the computer, participants spent several minutes responding to one of two essay prompts, each designed to appear customized to participants' "Very High" level of performance. The prompt in the directed abstraction condition read: "You indicated you earned a *Very High* score on the Intuitive Perception and Estimation ability test. Explain WHY you were able to achieve a *Very High* score. (Begin by completing the sentence stem below.) 'I was able to achieve a *Very High* score on the test because I am:'" In contrast, the prompt in the control condition read: "You indicated you received a *Very High* score on the Intuitive Perception and Estimation ability test. Describe HOW you completed the test. What did you do?"

Thus, participants in the control condition still thought about their performance, but the control prompt made no presuppositions about the cause of the success (participants "received" a score), used concrete action verbs ("completed", "do") to minimize abstraction, and used the phrase "Describe HOW" to elicit concrete descriptions. The directed abstraction prompt, on the

other hand, presupposed that participants were responsible for their success (“earned”, “achieve”), used abstract language (“were able”, “I am”), used the phrase “Explain WHY” to encourage abstract generalizations rather than concrete descriptions, and included a sentence-stem completion ending in “because I am:”, which was designed to elicit abstract generalizations to a personal ability (e.g., “good at estimating”).

Future Performance scale

Next, participants read short descriptions of ten situations requiring intuitive perception or estimation, such as guessing the number of jelly beans in a jar, and answered the question “How well would you do?” on a scale from 1 (Very bad) to 9 (Excellent). The mean of the ten responses ($\alpha = .84$) became participants’ Future Performance scores.

Ability scale

Participants then read seven statements asserting high levels of Intuitive Perception and Estimation Ability (e.g., “When estimating things (quantity, distance, time) I can rely on my intuition and do well.”) and rated each on a scale from 0 (not at all true of me) to 10 (very true of me). These statements were loosely based on a self-efficacy scale (Schwarzer & Jerusalem, 1995), but were modified to be specific to this particular performance domain. The mean of the seven items ($\alpha = .89$) became participants’ Ability scores.¹

Demographics, suspicion probes, and debriefing

Participants then answered demographic items and completed a funnel debriefing, which began with four suspicion probes that progressed from relatively neutral (“What did you think

¹ Besides the primary measures described above, we also included several exploratory measures following the Ability scale: the performance subscale of a state self-esteem scale (Heatherton & Polivy, 1991) and six items concerning such matters as participants’ perceptions of their performance on the test, the importance they placed on being high in the corresponding ability, and their interest in re-taking the test. There were no significant effects of Condition or the Condition by SC interaction on any of these exploratory measures, so we will not discuss them further.

the experiment was about?”) to increasingly suggestive (“Still thinking back to when you received your score, did you, at that time, believe the feedback?”) Participants were then fully debriefed. Besides being a sensitive way to gradually lead participants to the realization that they had been deceived, this method allowed us to assess participants’ suspicion across the four suspicion probes as well as in their earlier responses to the control or directed abstraction prompts. We only excluded five participants from the study for expressing clear and consistent suspicion across multiple such responses.

Results

To test our two hypotheses, that participants would self-verify in the control condition and that directed abstraction would help those with negative self-views generalize from their success, we first created a single composite score to represent generalization from the success to the self-concept (for a discussion of the advantages of analyzing composite scores, see Kraemer, 2010). To create this generalization composite, we standardized the Future Performance and Ability scores ($r = .52, p < .001$), averaged them, and then, to ease interpretation of the regression coefficients, we standardized the resulting score. We then conducted a hierarchical linear regression in which we regressed this standardized composite score onto Condition (dummy-coded: 0 = control, 1 = directed abstraction) and standardized SC in Step 1 and then added the Condition by SC interaction in Step 2. Both models are presented in Table 1, and the results are graphed in Figure 1. Step 1 revealed a significant main effect of SC ($B = .40$), $t(83) = 3.99, p < .001$, but no main effect of Condition ($B = .27$), $t(83) = 1.32, p = .19$. However, adding the interaction term revealed a significant interaction effect ($B = -.46$), $t(82) = -2.36, p = .02$. We used Hayes’s (2013) PROCESS macro for SPSS to probe this interaction. Participants’ SC scores significantly predicted their generalization scores in the control condition ($B = .66$), $t(82) = 4.49$,

$p < .0001$, suggesting self-verification processes, but this relationship was not significant in the directed abstraction condition ($B = .19$), $t(82) = 1.48$, $p = .14$. Additionally, for participants relatively low in SC (1 SD below the mean, $SC = 2.8$), being in the directed abstraction condition predicted a significant .73 SD increase in generalization scores compared to the control condition ($B = .73$), $t(82) = 2.63$, $p = .01$, whereas there was no such condition effect for participants relatively high in SC (1 SD above the mean, $SC = 3.9$), ($B = -.20$), $t < 1$.²

Discussion

The results from Experiment 1 confirmed our hypotheses. First, as predicted, the extent to which participants generalized from their success on the estimation task to beliefs about their abilities and expectations about future performance depended on their overall views of their competence, at least in the control condition. That is, control participants who entered the study with more negative beliefs about their general competence did not benefit as much from the success experience as participants with more positive self-views. Second, the directed abstraction intervention helped these participants with negative beliefs about themselves generalize more from their success than their negative self-view counterparts in the control condition.

Experiment 2

Having demonstrated in Experiment 1 that (a) initial self-views bias reactions to success, and (b) directed abstraction helps participants with negative self-views overcome that bias and generalize from a success, we next aimed to test the generalizability of those results. In Experiment 1, undergraduate participants completed the directed abstraction writing task immediately after a standardized, lab-engineered success experience in a relatively novel

² Scores on the standardized generalization composite differed by gender, such that men ($M = .27$, $SD = 1.01$) had higher scores than women ($M = -.18$, $SD = .96$), $t(84) = 2.1$, $p = .04$. However, gender did not moderate the Condition by SC interaction ($t < 1$), nor did including gender as a covariate substantially affect the reported results.

domain. In Experiment 2, we wanted to test whether the same results would occur with a paid internet sample recalling a past success in a domain in which most people have prior experience and established self-views: public speaking. We also modified the directed abstraction intervention to be more generally applicable following a success in any domain, rather than tied to one particular ability domain as in Experiment 1. In addition, we measured another consequence of generalization from a success, self-related affect. Past research suggests people with positive self-beliefs experience positive emotions following a success, whereas those with negative self-beliefs not only fail to experience these positive emotions, but also experience negative emotions such as anxiety (Wood et al., 2005). Because this experiment concerned a past success rather than a current one, and because we wanted participants to report not general affect, but affect directly related to their thoughts about the success experience and about themselves, we asked participants to report how thinking about their past success made them feel now. We viewed reports of more positive (and less negative) affect as another indicator of generalization from the success.

Our hypotheses were similar to those for Experiment 1. First, we predicted that in the control condition, the extent to which participants would generalize from a past public speaking success would correspond to their overall self-views. And second, we predicted that a more general version of the directed abstraction writing intervention would help participants with negative self-views generalize from the success, compared to participants with negative self-views in the control condition.

Method

Participants

Two-hundred and three native English speakers completed the study in exchange for \$1.00 on Amazon's Mechanical Turk website. Due to the nature of online data collection, we were vigilant for signs that participants did not follow instructions. Thus, we excluded one participant who did not follow the writing prompt, eleven who reported leaving the survey page to do something else during the three minutes they were required to spend writing the essay (described below), two who failed an attention check embedded in the dependent measures, and two who met more than one of these criteria. Of the remaining 187 participants, because we were interested in generalization from success experiences, we excluded 15 who reported that the experience they recalled was not even "somewhat successful" (the midpoint on a 9-point scale). Our final sample for analysis included 172 participants (72 women, 100 men).

Overview of Procedure

Participants first completed premeasures concerning their self-competence (SC) beliefs and their past experiences with public speaking. Then, after answering a few questions regarding the last time they engaged in public speaking, participants responded to either the directed abstraction essay prompt or a control prompt asking them to describe their speaking event in concrete terms. Participants then completed dependent measures regarding their public speaking abilities, expectations of future speaking performance, and self-related affect (e.g., pride, shame), after which they were debriefed.

Self-competence

We used the same 8-item measure of self-competence (SC; $\alpha = .88$) as in Study 1 (Tafarodi & Swann, 2001). For exploratory purposes we also included the self-liking subscale, as well as several items concerning general self-esteem. None of these measures performed as well

as SC in identifying participants likely to benefit from directed abstraction (i.e., in moderating the condition effect), so we will not discuss them further.

Past Experiences with Public Speaking

Participants responded to two statements concerning their past experiences with public speaking on a scale from 1 (strongly disagree) to 5 (strongly agree): “In the past, I have been generally effective at public speaking” and “I have a lot of public speaking experience”. We averaged these two items ($r = .64, p < .001$) to form a Past Experience score. We deliberately worded these items to elicit judgments about past behavior rather than beliefs about public speaking ability. As such, we did not intend this measure to be a moderator of the predicted condition effects (i.e., to identify participants with negative or positive self-views concerning speaking) but rather to be a covariate to account for the inevitable variation in the amount of evidence participants could draw on from their past suggesting that they are competent speakers.

Recalling the speaking event

Participants then were asked to recall the last time they spoke in public to at least a small group of people, such as a school or work presentation or a wedding toast. After entering a short phrase describing the event, participants reported how long ago the event occurred, from 1 (within the past week) to 8 (more than 10 years ago); how successful they were, from 1 (not at all successful) to 9 (very successful); and how easy it was for them to recall the event, from 1 (very difficult) to 9 (very easy).

Directed abstraction manipulation

To ensure that participants in both conditions would be writing about equally successful speaking experiences, we subdivided participants according to their ratings of how successful they were, and for each scale point from the midpoint (5, “Somewhat successful”) up, we

randomly assigned participants to either the directed abstraction or control condition with the stipulation that there be equal numbers who responded at that scale point in each condition. (Participants who rated their speaking event below “Somewhat successful” on the success scale continued the study and received payment, but were excluded from analysis.)

Participants in the directed abstraction condition responded to the prompt, “Explain WHY you were able to achieve such a successful performance. Begin by completing the sentence stem below. ‘I was able to achieve a successful performance because I am...’” This prompt was written so as to include all the critical elements of the prompt in Experiment 1 (abstraction, presuppositions of success and personal responsibility, and a leading sentence stem) while also being general enough to use with a wide variety of success experiences. Participants in the control condition instead responded to the prompt, “Describe HOW you performed as you did in this situation. What did you do?” As in Experiment 1, this control prompt was intended to elicit concrete descriptions of the success experience in question without including any of the language in the directed abstraction prompt that encouraged personal abstractions from the event to the self. In both conditions, participants were asked to spend three minutes thinking about and typing their response, and after three minutes the survey automatically advanced to the next page (participants who later reported leaving the page to do something else during that time were excluded from analysis).

Ability scale

Participants responded to three items regarding their beliefs about their public speaking abilities (e.g., “Overall, I am good at public speaking”) on a scale from 1 (strongly disagree) to 7 (strongly agree). We averaged the three responses to form a single ability score ($\alpha = .88$).

Future Performance scale

Participants read four hypothetical scenarios involving public speaking (e.g., “You must give a short presentation to your boss and a few other managers”) and reported how well they would do on a scale from 1 (Very poorly) to 9 (Very well). We averaged participants’ responses to these four items to create a future performance score ($\alpha = .84$).

Self-Related Affect scale

Participants were asked to think back to the public speaking experience they had recalled earlier and to rate the extent to which thinking about it now made them feel each of eight emotions (happy, sad, proud, ashamed, superior, inferior, confident, and uncertain) on a scale from 1 (not at all) to 4 (very much). Although this measure allowed us to compute separate scores for positive and negative affect, the results for negative affect tended to mirror those for positive affect ($r = -.39, p < .001$), so we reverse-scored the negative items and averaged all eight items to create a single self-related affect score ($\alpha = .85$), with higher scores representing more positive and less negative affect.³

Demographic items and debriefing

Participants then completed demographic items and reported whether they had left the page to do something else during the three minutes they were required to stay on the essay page (one of the exclusion criteria). Participants were then debriefed and paid.

Results

³ Although our primary hypotheses concerned the three measures described above, we also included several exploratory measures. Between the Ability and Future Performance scales, participants answered five questions regarding different aspects of their ability beliefs (e.g., the extent to which they felt capable of improving their speaking skills, or how their speaking skills compared to a typical peer). These items did not cohere as a single scale ($\alpha = .30$), and individual item analyses were not promising. Between the Future Performance and Self-Related Affect scales, participants completed six items concerning the extent to which they enjoyed public speaking and felt it was important. We were unsure whether the self-concept change that was our main goal would generalize to these more attitudinal items across such a short time span, and in fact no significant results emerged from these analyses.

As in Experiment 1, we first created a single composite score to represent generalization from the success to the self-concept by averaging the standardized scores from the Ability, Future Performance, and Self-Related Affect scales (r_s .59 to .72, $p_s < .001$) and then standardizing the resulting score. We then conducted a hierarchical linear regression in which we controlled for Past Experience and Success ratings, reasoning that accounting for the wide range of variability in both participants' past experiences with public speaking and how successful they thought they were would substantially increase our statistical power. However, controlling for ease of recall and how long ago the event occurred did not significantly account for additional variance, so we omitted those variables from the final analyses.

Thus, we regressed the generalization composite scores onto the standardized control variables Past Experience and Success in Step 1, adding Condition (dummy-coded: 0 = control, 1 = directed abstraction) and standardized SC in Step 2 and the Condition by SC interaction term in Step 3. These models are presented in Table 2, and the results are graphed in Figure 2. Step 1 revealed that, as expected, the two control variables accounted for a good deal of variance in the generalization composite (adjusted $R^2 = .61$). Adding the two terms in Step 2 revealed no overall effect of Condition ($B = .06$), $t < 1$, but a significant positive relationship between SC and generalization ($B = .27$), $t(167) = 5.45$, $p < .001$. The interaction term added in Step 3 was significant ($B = -.21$), $t(166) = -2.40$, $p = .02$. Probing the interaction revealed the predicted pattern of results. First, participants' SC scores significantly predicted their generalization scores in the control condition ($B = .38$), $t(166) = 5.69$, $p < .001$, suggesting self-verification processes, but this relationship was attenuated, though still significant, in the directed abstraction condition ($B = .17$), $t(166) = 2.62$, $p < .01$. Second, for participants relatively low in SC (1 SD below the mean, $SC = 2.6$), being in the directed abstraction condition predicted a significant .26 SD

increase on the generalization composite compared to the control condition ($B = .26$), $t(166) = 2.14$, $p = .03$, but there was no similar condition effect for participants relatively high in SC (1 SD above the mean, $SC = 4.0$), ($B = -.16$), $t(166) = -1.26$, $p = .21$.

Discussion

The results from Experiment 2 confirmed our hypotheses. First, the extent to which participants generalized from their recalled public speaking success depended, as in Experiment 1, on their initial views of their overall competence. That is, participants in the control condition who began the study with more negative self-competence beliefs generalized less after recalling a successful public speaking performance than did those who began the study with more positive self-competence beliefs. However, as predicted, the directed abstraction writing intervention helped these participants with negative self-views generalize more from their recalled success than did their negative self-view counterparts in the control condition.

Beyond conceptually replicating Experiment 1, the results from Experiment 2 add several important elements to the picture. First, we included a measure of self-related affect (e.g., pride, shame). This type of affective response to success is not only an additional indicator of whether participants viewed the success as generalizable to the self-concept and thus indicative of an underlying ability, but is also an important outcome in and of itself (e.g., Fredrickson, 2001, 2013). Second, we tested a more general version of the directed abstraction writing intervention that should, with only slight modification, be applicable to a number of different performance domains, rather than be tied to any particular success context. And third, by using a different sample, experimental context, success experience, and ability domain, we demonstrated that our findings from Experiment 1 are generalizable and thus likely to replicate in different contexts and instantiations. It is especially noteworthy that Experiment 2 replicated the results from

Experiment 1 with a recalled success rather than one that had just occurred. Indeed, none of the reported findings were dependent on the age of the memory, which is quite remarkable, given that participants were recalling events that had taken place anywhere from within the past week to more than 10 years prior to the study.

Experiment 3

In Experiment 3, we wanted to test our hypotheses regarding self-views, generalization, and directed abstraction in the context of a real public speaking success in the lab. It seemed important to show that our findings from the first two experiments would replicate with a more realistic, impactful, and immediate success experience rather than one that was entirely fabricated (Experiment 1) or simply recalled from one's past (Experiment 2). We also hoped to demonstrate one possible application of directed abstraction by creating a success experience loosely approximating what might occur during exposure treatment for a phobia.

In the first two experiments, we hypothesized both that overall self-views would predict generalization from success in a control condition and that directed abstraction would lead to generalization for participants with negative overall self-views. However, in Experiment 3, we chose to focus our statistical power on the second hypothesis by recruiting only participants with relatively negative self-views, and we also narrowed our construct of interest from overall self-views to those specific to public speaking, with the intention of demonstrating directed abstraction's potential therapeutic applications. That is, instead of screening participants based on general self-competence beliefs, we used a measure specific to public speaking to better identify participants with negative beliefs about their speaking abilities, who should be most likely to resist drawing positive conclusions about either their performance or their speaking ability. Thus, in Experiment 3, participants with negative views of themselves as public speakers

delivered a series of two speeches under conditions designed to help them succeed. Then they completed either the directed abstraction writing task or a control task, followed by dependent measures related to generalization to the self-concept. We predicted that participants in the directed abstraction condition would generalize more from their success than those in the control condition.

Method

Participants

Sixty participants completed the study in exchange for credit in an introductory psychology course. We excluded one non-native English speaker who demonstrated a lack of fluency in both verbal and written responses and failed an attention check item embedded in the dependent measures. The other 59 participants made up our final sample (38 women, 21 men).

Overview of Procedure

Participants first completed a measure of public-speaking self-views during a departmental mass-testing session at the beginning of one of two semesters during which the study took place. We invited those who scored below the median of this measure to participate in a study on public speaking. Each participant completed the study individually. After giving informed consent, participants read a prompt, prepared a speech, and then gave the speech alone in a room with a video camera. After the speech, participants reviewed their performance in a procedure intended to increase perceptions of a successful performance (Rodebaugh, Heimberg, Schultz, & Blackmore, 2010). Participants then responded to either the directed abstraction writing prompt or a control prompt. Next, participants repeated the entire procedure with a second, more difficult speech prompt. After completing the second directed abstraction or control writing task, participants moved on to the dependent measures, including self-judged

public speaking ability, expectations of future public speaking performance, and a longer version of the same public speaking self-views questionnaire administered during mass testing (because many of the items were affective in nature, this scale doubled as a measure of both domain-specific self-views and public-speaking related affect). Participants were then fully debriefed.

PRCS-12 – pretest

To identify participants least likely to generalize from a speaking success, and thus most likely to benefit from directed abstraction, we administered during a mass-testing session the PRCS-12 (Hook, Smith, & Valentiner, 2008), a short form of the Personal Report of Confidence as a Speaker (PRCS; Gilkinson, 1942; Paul, 1966), a widely-used measure of fear of public speaking. The 12 items each require a true or false response, with true responses indicating negativity (e.g., “I am terrified at the thought of speaking before a group of people”). Of the 1,428 participants who completed the mass-testing session, we invited roughly the most negative half (46%) of participants (i.e., those who chose “true” to more than half of the 12 items). The scale’s internal consistency was good in the mass-testing sample ($N = 1,428$; $\alpha = .86$) and acceptable in the final sample ($N = 59$; $\alpha = .58$), especially considering the dichotomous nature of responses and the restricted range of the final sample.

First speech

After arriving and giving informed consent, each participant was led into a room containing a computer, intercom system, and video-camera. After explaining the procedures, the experimenter left the room and instructed the participant via intercom to begin preparing a speech following the prompt displayed on the computer, which concerned participants’ transition from living at home to living on their own in college. We hoped that the personal, informal topic of this first speech would put our anxious participants at ease and help them achieve a successful

performance. On the other hand, so that it would feel like a formal speech and thus be generalizable to their overall public speaking self-views, we asked participants to stand, make eye contact with the video camera, and speak for three full minutes, if possible. Participants had three minutes to prepare and make notes, but could not use those notes during the speech.

Video feedback

To help participants label their speech a success, we developed a procedure based on a video feedback paradigm shown to improve participants' perceptions of their performance and reduce future anxiety (Rodebaugh et al., 2010). At the end of the speech, the experimenter led the participant to a video monitor and explained that research shows people tend to rate their speech performance worse than observers do, partly because they focus on how they felt rather than how they appeared, whereas observers can only base judgments on how the speaker appeared. The experimenter continued that because people tend to feel more nervous than they appear, they think their speech was worse than it was. After making sure the participant understood, the experimenter then asked the participant to watch his or her speech as if watching a stranger, specifically focusing on how they appeared rather than how they felt, suggesting that most people report they performed better than they thought they had. When the speech ended, the experimenter suggested that the participant had done better than he or she thought, and attempted to elicit verbal agreement to that effect from the participant.

Directed abstraction manipulation

Participants then spent at least three minutes responding to one of two writing prompts. In the directed abstraction condition, the prompt read, "Explain WHY you were able to achieve a successful performance on the speech (Begin by completing the sentence stem below.) 'I was

able to achieve a successful performance because I am'". In the control condition, the prompt read, "Describe HOW you delivered the speech. What did you do?"

Second speech, video feedback, and manipulation

Participants then repeated the entire process with a second speech prompt. Because we wanted the second speech to be more challenging and to feel more formal than the first, this prompt asked participants to discuss pros and cons of government censorship of the internet. This time participants had five minutes to prepare, but as before, they were not allowed to use notes while giving the speech, and they were asked to speak for three minutes. Participants then underwent the same video feedback procedure as for the first speech, followed by another writing task matching the one they completed earlier (i.e., participants responded to either the directed abstraction prompt after both speeches or the control prompt after both speeches).

Dependent measures

Participants completed the 3-item Ability scale ($\alpha = .73$) and the 4-item Future Performance scale ($\alpha = .62$), both identical to those administered in Experiment 2. They then completed the full 30-item version of the PRCS (the short form of which, the PRCS-12, had been used to prescreen participants), which included a mixture of items relating to affective responses to public speaking, beliefs about one's speaking abilities, attitudes toward public speaking, and approach/avoidance behavior. To increase the measure's sensitivity, we replaced the traditional true/false scale with a 6-point scale, from 1 (Not at all true of me) to 6 (Very true of me). The average of participants' responses to the 30 items ($\alpha = .93$) became their PRCS-posttest score.⁴

⁴ While the measures reported above were most central to our hypotheses, we also included several exploratory measures for which we made no strong predictions, but included to assess the possibility that our effects would be stronger, farther-reaching, and more immediate than we anticipated. Directly before the Ability scale, participants answered six questions regarding their performance on the second speech. This measure was unaffected by condition, indicating that directed abstraction did not have an immediate effect on anxiety or perceptions of the

Demographics and debriefing

Participants then answered demographic items, were asked to guess the experimental hypotheses (none guessed that the writing tasks were manipulated or were intended to affect their self-views), and were debriefed.

Judged speech quality

Although we did not expect directed abstraction following the first speech to have an immediate effect on the quality of the second speech, we did want to control for speech performance in our other analyses to account for error variance. After the study, two raters each rated the first minute of each speech for overall quality. The raters discussed and attempted to resolve any disagreements, and re-watched (with the option to re-rate) the first five or ten videos of each speech in case their standards had shifted during the rating process. This process resulted in good inter-rater reliability for both speech one ($r = .90, p < .001$) and speech two ($r = .82, p < .001$).

Results

As in the previous experiments, we first created a composite variable representing generalization from the success by averaging participants' standardized scores on the Ability, Future Performance, and posttest PRCS scales ($r_s .51$ to $.57, p_s < .001$) and then standardizing that average. We then conducted an ANCOVA using condition to predict generalization scores,

quality of one's speech. After the Future Performance scale, participants completed six items concerning the extent to which they viewed public speaking as enjoyable and important; as in Experiment 2, these items were unaffected by directed abstraction. Prior to the other dependent measures, participants completed an implicit measure of attitudes toward public speaking, a personalized single-category Implicit Association Test identical to the one Vasey and colleagues (2012) used to predict return of fear one month after exposure treatment for fear of public speaking. We found no effects of directed abstraction on this measure, nor did we necessarily expect such effects, given our non-clinical sample, our non-longitudinal time scale, and our mere approximation of a true exposure treatment session. We nonetheless chose to include the measure in case our manipulation had an even more substantial and immediate impact than we expected. Future studies should explore whether the self-concept change we have observed in these experiments generalizes, over time, to more favorable attitudes toward the domain in which the success occurred.

controlling for standardized pretest PRCS-12 scores and judges' ratings of the first speech. We controlled for pretest PRCS-12 scores because, despite only recruiting from the most negative half of participants on that measure, there was still substantial variability within our sample, and we expected this variability to account for what would otherwise be error variance in our analyses. We similarly controlled for judges' ratings of the first speech, reasoning that those participants who actually performed better would naturally score higher on our generalization measures. (We chose not to control for judged quality of the second speech because it occurred *after* the first writing task manipulation; however, the results were similar whether controlling for judges' ratings of speech one or of both speeches, and condition did not significantly affect the quality of the second speech.) This ANCOVA revealed that, as predicted, participants in the directed abstraction condition (adjusted $M = .26$, $s.e. = .16$) scored higher on the standardized generalization composite than participants in the control condition (adjusted $M = -.27$, $s.e. = .16$), $F(1, 55) = 5.24$, $p = .03$, semi-partial $\eta^2 = .07$.

Discussion

The results from Experiment 3 confirmed our hypothesis: the directed abstraction writing task led participants (who, in this experiment, all had relatively negative self-views as public speakers) to generalize more from their speaking success than they otherwise would have. By only recruiting participants with negative self-views, we were unable to examine the relationship found in the first two experiments between overall self-views and generalization from a success. On the other hand, our design allowed us to focus our statistical power on the more interesting and novel prediction regarding people with negative self-views and directed abstraction. In addition, by focusing in on this negative self-view group, we were able to employ a more

elaborate method to create success experiences that were more impactful and ecologically valid than in our first two studies.

By conceptually replicating the results from the first two experiments using a more realistic success experience in an important domain, we accomplished more than simply demonstrating the generalizability of our findings. Specifically, our speech procedure roughly approximated what would occur during the first two trials of a full session of exposure treatment for fear of public speaking, and we recruited participants who would not only benefit from such treatment, but who would also likely resist drawing positive self-inferences following a successful speech. The results from Experiment 3, then, demonstrate the power and generalizability of the effects found in the first two experiments, while at the same time illustrating one possible application for the directed abstraction technique we have developed.

Experiment 4

The effects in Experiments 1 through 3 are limited to self-report measures regarding the self-concept. In Experiment 4, we addressed this limitation by testing whether directed abstraction following a success increased participants' likelihood to persist in the face of a subsequent failure, an important behavioral outcome.

The self-concept change produced by the directed abstraction manipulation in Experiments 1 through 3 should clearly have behavioral consequences (Bandura, 1977). Indeed, ability beliefs and performance expectations predict performance in varied domains, including academics (Marsh & Craven, 1997), general cognitive abilities (Paunonen & Hong, 2010), teaching (Klassen & Tze, 2014), and sports (Boyce & Bingham, 1997; Marsh, Chanal, & Sarrazin, 2006). These effects often play out over time in a way suggesting causality: changes in self-beliefs generally predict subsequent changes in performance (for a review, see Marsh &

Craven, 2006). And, although much of this research is correlational, at least some research has experimentally manipulated performance expectations to show they have a causal impact on performance, especially on difficult tasks (Marshall & Brown, 2004). Our goal in Experiment 4 was to demonstrate one important behavioral consequence of the positive self-concept change that results from directed abstraction: persistence in the face of failure.

We chose to focus on persistence as a behavioral outcome for several reasons. First, persistence should theoretically be a function of performance expectations and ability beliefs. A person who believes a prior success was due to an ability should expect to overcome challenges in that domain, leading to persistence, whereas someone who fails to generalize from a prior success should expect to fail and thus should not persist. Supporting this view, previous research has linked persistence to self-beliefs (e.g., Di Paula & Campbell, 2002). Our second reason for focusing on persistence was its real-world importance. It is difficult, if not impossible, to progress in any domain if one gives up at the first sign of failure. Failure to keep going when the going gets tough may be a key pitfall for people with overly negative self-views, preventing them from translating an initial success into the sort of sustained approach behavior that is often necessary to improve one's abilities in a domain.

Our third reason for choosing persistence in the face of failure as our behavioral outcome was that it seemed possible the psychological state of acute self-doubt induced by expecting another success and instead experiencing intense failure might result in directed abstraction benefiting even participants with initially positive self-views. That is, the previous three experiments examined the effects of directed abstraction in contexts in which participants with negative self-views struggle to fully reap the benefits of a success, but those with positive self-views presumably have no such problems viewing the success as having stemmed from their

abilities. In this experiment, we hoped to create a context in which even participants whose positive self-views would lead them to naturally generalize from their success would soon have reason to doubt that initial generalization, at least in the control condition, whereas directed abstraction might help these positive-self-view participants deal with the threat of failure, perhaps by construing the threat as a challenge (Blascovich, Seery, Mugridge, Norris, & Weisbuch, 2004). This reasoning is supported by research showing that self-affirmation, another social psychological writing intervention, has the clearest benefits under conditions of psychological threat (Cohen & Sherman, 2014); similarly, we think directed abstraction, which Experiments 1-3 showed is beneficial for those who find success threatening due to their negative self-views, will also be beneficial for those whose positive self-views are threatened by failure.

To test these ideas, in Experiment 4 we administered the directed abstraction manipulation following a success on what participants thought was a measure of verbal intelligence. Our dependent measure was persistence on a similar task in the face of failure. We predicted that participants in the directed abstraction condition would persist longer on this subsequent task than those in the control condition. Although we speculated that, according to the above reasoning, directed abstraction might increase persistence regardless of participants' initial self-views, we measured self-competence to assess any possible moderation.

Method

Participants

We recruited 78 undergraduate students to complete the study in exchange for credit in an introductory psychology course. As in the previous three experiments, our hypotheses only regarded participants who succeeded, and despite efforts to orchestrate a success experience for

all participants, eight failed to score higher than the presumed average on our test (see below). Of the 70 successful participants, we excluded 6 for clear lack of engagement⁵. Our final sample included 64 participants (32 women, 31 men, and one who did not report gender).

Overview of Procedure

Upon arrival, the experimenter explained to participants that the study was divided into two parts. First, participants would take a test of “Linguistic Flexibility”, purportedly a key element of verbal intelligence, and second, they would help test the difficulty of new problems for future versions of the test, although after a few of these problems they would have the option to switch to another task. Participants then gave consent, answered several questionnaires, took a test designed to elicit a successful performance while still being challenging, received their score, and completed a control or directed abstraction writing task. They then attempted a number of difficult or impossible problems similar to those from the success task, with the option to switch to another task after every six problems. Finally, participants answered demographic items and completed several attention and suspicion checks before being debriefed.

Self-competence

Participants first completed the self-competence (SC) scale used in Experiments 1 and 2 ($\alpha = .65$), followed by several filler scales to obscure the purpose of measuring SC.

Success feedback

For the “Linguistic Flexibility” test (i.e., the “LiFT”), participants completed 12 anagrams (e.g., “vahey”, “slapam”) that were tailored in an adaptive fashion to match their performance, increasing or decreasing in difficulty as participants progressed through the test.

⁵ These six excluded participants gave us reason to doubt they were engaged enough to even notice they had succeeded: one was unable to correctly recall his score at the end of the study, and the other five were unable to correctly recall the presumed average score.

This tailoring allowed us to create, for at least most participants, the experience of performing well on a test that was nonetheless challenging, and in contrast to the false feedback paradigm in Experiment 1, we were able to give participants accurate feedback for each trial, thus creating a more vivid illusion of success. Participants could use scrap paper to work out their answers, but were asked not to spend more than a minute or two on each problem, after which they should skip an anagram they could not solve. Importantly, both the experimenter and the computer-administered instructions noted that the average score was 6 out of 12, or 50%. Also, to ensure participants paid close attention to their score (and could thus compare it to the presumed average), the experimenter asked them to carefully examine their feedback page for accuracy, claiming that the score display system had been malfunctioning and that they should add up their score and report any errors on a subsequent screen. Participants' average score in the final sample was 9.1 out of 12.

Directed abstraction manipulation

Onscreen instructions then led participants to believe that, because we wanted to better understand the factors leading to different levels of verbal intelligence, we were asking them to provide us with some thoughts on their performance in the form of a short essay. Participants in the directed abstraction condition responded to the prompt "You earned a score of <actual score> / 12 on the LiFT test. Explain WHY you were able to achieve this score on the test. (Please begin your response by completing the sentence stem below.) 'I was able to achieve this score on the LiFT test because I am:'" In contrast, participants in the control condition responded to the prompt "You received a score of <actual score> / 12 on the LiFT test. Describe HOW you completed the LiFT test. What did you do?" As in the previous experiments, although both prompts reminded participants how well they did and prompted them to think about their

performance, only the directed abstraction prompt used abstract language, presupposed participants were responsible for their success, and employed a sentence stem to encourage generalizations to a personal ability.

Persistence trials

Next, we led participants to believe we needed their help testing the difficulty of new problems for future versions of the LiFT. However, after six such problems (and after every six problems thereafter), participants who preferred to do something else could switch to spatial rotation problems, for which we also needed normative data. The experimenter's opening script included a seemingly off-script remark that people so far had found the test anagrams quite difficult, but that persistence seemed to be the best strategy, so participants should simply give their best effort. These instructions were carefully crafted based on prior work outlining possible boundary conditions for when positive self-beliefs will predict persistence: when people believe persistence is a good strategy (Sandelands, Brockner, & Glynn, 1988) and when there is an alternative goal available (Di Paula & Campbell, 2002, Study 1).

All participants completed the first set of six persistence trials. Four of these trials were extremely difficult, more so than any of the previous problems participants had attempted (e.g., "ferig"), and two were impossible (e.g., "andleb"). Participants could then choose to either continue attempting anagrams or switch to a spatial rotation task. If participants persisted on the anagrams, this choice was repeated every six problems until participants had completed four sets, or 24 anagrams total, nine of which were impossible and the rest extremely difficult. Participants who chose to switch tasks completed relatively simple spatial rotation problems until they had done 24 problems total.

Demographics, misc. checks, and debriefing

Participants provided demographic information and completed items assessing engagement and suspicion, including questions asking them to recall the score they received on the LiFT and the presumed average score. To assess suspicion, we asked participants to describe what they thought the study was about⁶. Participants were then debriefed.

Results

We began by operationalizing persistence as the number of 6-trial sets of difficult/impossible anagrams participants chose to attempt. We required all participants to complete the first set, and 45 (70.3%) stopped there, choosing to switch to the spatial rotation problems at the first opportunity, while 14 (21.9%) completed the 2nd set before switching, and only 3 (4.7%) and 2 (3.1%) stopped after the 3rd set or made it all the way to the 4th set, respectively. Given this extremely skewed distribution, it was clear the best strategy was to dichotomize our persistence variable into 2 groups: the 45 (70.3%) who switched as soon as possible vs. the 19 (29.7%) who chose to attempt one or more additional sets of anagrams following the first failure-inducing set.

Table 3 presents the number of participants in each cell of the 2 (condition) by 2 (persistence) matrix. As expected, participants in the directed abstraction condition were more likely to persist (13 out of 31, or 41.9%) than participants in the concrete condition (6 of 33, or 18.2%), $\chi^2(1, N=64) = 4.32, p = .04, \psi = .26$. Participants in the directed abstraction condition were thus 2.31 times more likely to persist than their counterparts in the concrete condition.⁷

Discussion

⁶ Several participants were mildly suspicious of various aspects of the study, but none reported suspecting that their score on the initial test had been falsified. Excluding these participants did not change the significance of the results.

⁷ Although we had reason to expect a main effect of directed abstraction, we also tested whether the Condition effect was moderated by self-competence (SC) via a binary logistic regression predicting persistence from Condition, SC, and the interaction term. The interaction was not significant ($p = .37$), although interestingly, the pattern of results was consistent with those from Experiments 1 and 2 (i.e., a larger effect for participants low in SC, $p = .047$ at 1 SD below the mean, than for those high in SC, $p = .37$ at 1 SD above the mean).

The results from Experiment 4 showed that the effects of directed abstraction following a success extend beyond simple self-report measures. In fact, the manipulation led participants to persist longer at an extremely difficult task rather than switching to something easier. Importantly, this effect occurred in a context in which participants believed persistence was an adaptive strategy – it likely had worked well during the success version of the task, and the experimenter had hinted that it would be especially effective during the failure trials. This result is consistent with research suggesting positive self-beliefs can lead to effective self-regulation of goal-directed behavior rather than a more mindless, maladaptive type of persistence (Di Paula & Campbell, 2002). Indeed, the fact that only five participants persisted beyond the second set of difficult and impossible anagrams suggests that even those in the directed abstraction condition who passed up the first opportunity to quit eventually learned that persistence was fruitless on this particular task. The positive generalizations produced by directed abstraction appear to encourage persistence when it is likely to be effective, rather than a maladaptive “banging one’s head against the wall” type of mindless persistence.

We chose persistence in the face of failure as our critical test of the behavioral effects of directed abstraction partly because this type of persistence is likely necessary to actually build one’s skills in a given domain. For example, even if a beginning lecturer generalizes after giving a successful lecture and begins to believe in his or her abilities, there will inevitably come times when students fall asleep in class, fail to learn a basic concept, or fail to laugh at a well-crafted joke. Persisting when the going gets tough is a necessary intermediate step on the path from an initial success to true mastery.

Besides being an important outcome itself, persistence following failure says something about the nature of the self-concept change we observed following directed abstraction in

Experiments 1-3. If that self-concept change was somehow ephemeral, perhaps just a short-term consistency or demand effect, it likely would not have carried over to participants' subsequent decisions to persist on what they believed was an unrelated task in Experiment 4 (only four participants expressed suspicion that we were interested in whether or not they chose to continue with the anagram task, and excluding them had no effect on our results). Thus, the self-concept change resulting from directed abstraction most likely reflects not some ephemeral motive to respond consistently or to please the experimenter, but instead an actual change in beliefs about one's abilities in a particular domain, and as Experiment 4 demonstrated, such beliefs can have important behavioral consequences.

Further, the results from Experiment 4 suggest that choosing whether or not to persist in the face of unambiguous failure is one situation in which directed abstraction has benefits not just for participants with negative overall self-views, but also for those with more positive self-views, whom an extreme failure may place in a temporary state of self-doubt. Thus, even though in Experiments 1 and 2 there appeared to be no effect of directed abstraction on our self-concept measures for participants with positive self-views, the manipulation may have somehow strengthened those positive self-beliefs, enabling them to withstand the direct threat of subsequent failure (or perhaps it enabled participants to reinterpret the failure as a challenge rather than a threat, at least for a few trials; Blascovich et al., 2004). Although more work is needed to confirm this finding and examine these possible mechanisms, these results at least suggest one context in which even people with positive self-views may benefit from directed abstraction.

General Discussion

Overall, the four experiments support our model of the post-success generalization process and how negative self-views prevent some people from fully benefiting from a success experience. Additionally, they introduce a powerful new social influence technique for encouraging people to generalize from a success when they otherwise would fail to do so. Past research suggests that people with negative self-views fail to generalize from a success to the self-concept (e.g., Jussim et al., 1995; Shrauger & Rosenberg, 1970; Wood et al., 2005), and Experiments 1 and 2 replicated those results. However, in all four experiments, directed abstraction overcame these tendencies, helping people translate a success into more positive judgments about an ability (Experiments 1-3), higher expectations of future performances (Experiments 1-3), and more favorable affective responses concerning the self (Experiment 2) and the performance domain (Experiment 3). Further, Experiment 4 demonstrated one important behavioral consequence of directed abstraction, increased persistence on a challenging task in the same ability domain as the initial success.

One strength of the current research is the varying methods across the four experiments, increasing the generalizability of the results. We used four different success experiences (a fabricated success on a dot estimation task in Experiment 1, a recalled speaking success in Experiment 2, an in-lab speaking success in Experiment 3, and success on anagram problems in Experiment 4), three different ability domains (intuitive estimation in Experiment 1, public speaking in Experiments 2 and 3, and verbal intelligence in Experiment 4), two different sample types and contexts (undergraduate students in the lab in Experiments 1, 3, and 4, and internet participants in Experiment 2), and two different ways of operationalizing negative self-views (overall self-competence in Experiments 1 and 2, and a classic measure of public speaking self-

views that also incorporated attitudes and affect in Experiment 3). In other words, our conclusions are not limited to any one set of circumstances and operationalizations.

Similarly, the directed abstraction manipulation differed between the four experiments. We began with a writing prompt in Experiment 1 that was very specific to the domain and success experience in question (referring to the specific feedback participants received), moved to a much more general prompt in Experiment 2 (referring only to a “successful performance”), added language to make the prompt specific to the speeches that participants gave in Experiment 3 (referring to a successful performance “on the speech”), and finally returned to the highly tailored first version of the prompt in Experiment 4. This variation shows that the directed abstraction technique we have designed can be very specifically tailored to the success in question, broad enough to encompass multiple types of success with little or no modifications, or somewhere in between. We imagine it would be easiest and most effective for researchers and practitioners to begin with the prompt from Experiment 2 and then, if desired, add several words referencing the specific success experience, as we did in Experiment 3.

This research begins to fill an important gap in the literature. Much of the past research in this area was designed to test hypotheses regarding reactions to success vs. failure, and so was somewhat burdened by the need to include not just success conditions, but also failure and sometimes no-feedback conditions. By focusing only on reactions to success, and in Experiment 3 only on participants with negative self-views, we were able to zero in on what, to us, is a particularly interesting scenario (when participants with negative self-views succeed) that in much past work has simply been one cell in a 2 x 2 design (if not ignored in favor of studying reactions to failure). In doing so, we were able to examine more closely previous findings suggesting that people with negative self-views do not benefit from success as much as those

with positive self-views (Brown & Dutton, 1995; Fitch, 1970; Wood et al., 2005), as well as introduce a manipulation designed to erase those differences.

However, more work is needed to examine default reactions to success among people with negative self-views, as well as how directed abstraction redirects those maladaptive processes in more promising directions. In the current studies, we combined several different measures of generalization, all conceptually and empirically related to each other but nonetheless representing distinct constructs, into single composite scores to ease interpretation and increase our statistical power to test our hypotheses, which concerned generalization rather than any specific belief, expectation, feeling, etc. Nonetheless, it is possible that one such variable is more key to the generalization process than others, or that the process unfolds in a step-by-step manner (e.g., ability beliefs may lead to different expectations about the future, which in turn have affective and behavioral consequences). Future work testing how such generalization processes play out should include measures at multiple time points, i.e., a longitudinal design, to enable lagged analyses. This type of longitudinal design would also make it feasible to examine more distal generalization outcomes, such as approach motivation, approach behavior, actual performance, and attitudes, and whether or not the proximal self-concept variables we measured in the current work not only persist, but predict those motivational, behavioral, and attitudinal outcomes; indeed, prior work shows that positive changes in people's views of their abilities predict subsequent increases in performance (e.g., Marsh & Craven, 1997, 2006). In fact, if those downstream consequences cause, in turn, positive changes to the self-concept, the result could be an upward spiral of cascading benefits.

For example, imagine Nadia, a student who feels anxious and avoids public speaking opportunities because her negative beliefs about her poor speaking abilities lead her to expect to

fail. If Nadia were to suddenly believe she is a decent public speaker (e.g., from engaging in a directed abstraction exercise following a speaking success, perhaps even in the context of exposure treatment), she might also stop expecting to fail, removing a major source of her speaking anxiety. Without the expectation of failure and associated negative emotions, Nadia should be more likely to seek out (or at least stop avoiding) opportunities to speak in public, even if those speaking opportunities seem challenging to her or if she initially fails, and she may even perform better. This exposure to additional public speaking successes should further reduce Nadia's fears, negative self-beliefs, and expectancies of failure. Finally, without the behavioral, cognitive, and affective bases for a negative evaluation of public speaking, Nadia's attitudes toward public speaking should become more positive, and these positive attitudes should lead to increased generalization every time she succeeds (Vasey et al., 2012). In sum, believing that one is good at public speaking may well spark a virtuous cycle of self-improvement that includes a cascade of benefits regarding self-beliefs, exploratory behavior, attitudes, affect, expectations, and performance.

Of course, administering a directed abstraction manipulation will not always be appropriate. First, in a situation in which participants firmly believe they did not succeed, the writing prompt will make no sense. If anything, given the link between abstract processing of negative events and depressed affect (Watkins, Moberly, & Moulds, 2008, 2011), encouraging people to think abstractly in such cases may backfire. And concerning the positively-directed nature of the abstraction, research continues to show the many ways positive feedback can backfire for those with negative self-views (e.g., Brummelman et al., 2014; Wood, Perunovic, & Lee, 2009). While it is a testament to the power of directed abstraction that it can help such people draw positive conclusions about themselves when so many other strategies backfire,

directed abstraction itself may backfire if administered following anything but a success in the domain in question. Second, even if participants believe they succeeded, if that view does not correspond to reality, then directed abstraction could have harmful consequences. While there are numerous situations in which people underestimate their abilities or fail to draw appropriately positive conclusions following a success, there are also situations in which people do not make these positive self-inferences because they are clearly not warranted, and in such situations, encouraging people to overestimate their own abilities would be undesirable. Part of this problem may be sidestepped by the fact that directed abstraction is unlikely to work when there is only weak evidence that one has succeeded, but the technique should nonetheless be used with caution so as not to produce overly-inflated, unrealistic self-views.

Directed abstraction vs. other abstraction manipulations

Our directed abstraction technique is not the only writing manipulation related to abstraction, and it is worth considering how this new social influence technique relates to existing methods. The most obvious candidate for comparison is the abstract reframing intervention developed by Marigold and her colleagues (2007, 2010) to help low self-esteem participants generalize from a compliment from a romantic partner. Although this research initially inspired our work, the two differ in important ways. Most notably, the Marigold et al. (2007) abstract reframing task was designed specifically to address the tendency of people with low self-esteem to underestimate their partners' regard for them, leading to outcomes such as decreased relationship satisfaction (Murray et al., 2001). These processes have received a large amount of empirical and theoretical attention (e.g., Murray, Derrick, Leder, & Holmes, 2008). That abstract reframing was closely based on this rich theoretical framework no doubt contributed to its impressive results, but this close link to the relationship context also limits the

intervention's generalizability. Our directed abstraction technique, on the other hand, is applicable to any situation in which people's preexisting self-views prevent them from concluding that they have an ability or aptitude despite evidence to the contrary (i.e., a success experience). Thus, while we were inspired by the methods and overall spirit of this prior work, our directed abstraction technique is situated within a theoretical context that is quite separate from that of Marigold and colleagues' (2007, 2010) intervention, and the potential uses of these two techniques differ accordingly.

Directed abstraction relies largely on the concept of abstraction, and as such owes a debt to theories of abstraction. Besides the linguistic category model discussed in the introduction (Semin & Fiedler, 1988), construal-level theory (Trope & Liberman, 2010) provides another theoretical perspective from which to view the current research. Construal-level theory examines how concretely or abstractly people represent situations and objects. Our directed abstraction manipulation may induce a high-level or abstract mindset, such that people focus on the broader meaning of their success experience rather than the specific, concrete, low-level details. Indeed, the focus on why vs. how in the directed abstraction manipulation was based on a construal-level manipulation (Freitas, Gollwitzer, & Trope, 2004). However, focusing on the big picture is likely necessary, but not sufficient, to produce generalization from a success to the self-concept, and without guiding the specific content of the abstraction, such a mindset manipulation could backfire (e.g., Watkins, Moberly, & Moulds, 2008, 2011). That is, a person with negative self-views who considers a success in terms of broad, abstract meaning may simply compare the success to the rest of his or her self-knowledge and conclude that the success was an anomaly. Because abstraction by itself can be positive or negative, the "directed" part of directed abstraction is essential.

Directed abstraction also bears some resemblance to manipulations of 1st- vs. 3rd-person perspective in mental imagery. Picturing an event from a 3rd-person perspective (i.e., as from an outsider's perspective) is associated with thinking of an event more abstractly (Libby, Shaeffer, & Eibach, 2009) and as part of a larger coherent self-narrative (Libby & Eibach, 2011), which can have powerful consequences (e.g., increasing voting behavior; Libby, Shaeffer, Eibach, & Slemmer, 2007). One might wonder if such a manipulation would have similar effects to directed abstraction following a success experience. However, it is possible 3rd-person imagery would backfire for participants with negative self-views by causing them to consider their success in the context of their broader negative self-concepts. In support of this view, imagining failure in the 3rd-person perspective led low self-esteem participants to generalize more from the failure (Libby, Valenti, Pfent, Eibach, 2011). So again, the ability of directed abstraction to “direct” those with negative self-views toward *positive* generalizations is likely crucial to its success.

Besides the manipulations discussed above, there are others that might be comparable in some ways to directed abstraction, such as self-distancing (Kross & Ayduk, 2011) and other linguistic identity framing techniques (e.g., Bryan et al., 2011; Walton & Banaji, 2004). However, while these manipulations all rely on abstraction to some extent, the precise mechanisms underlying these techniques surely differ, and as such, none of them should be expected to replicate the effects of directed abstraction on the self-concepts of participants with negative self-views following a success. Of course, this claim is largely speculative, and this research area would benefit not just from empirical work comparing the effects of these manipulations in different contexts, but also from theoretical work integrating the various manipulations under a comprehensive conceptual framework. In the meantime, we consider directed abstraction to be a mid-level social influence technique that, although more limited in

scope than other methods tied to broader theories (e.g., construal-level theory), is highly effective in dealing with the problem of undergeneralization from success.

Conclusion

People with negative views of themselves fail to benefit as much as they might from success experiences: they continue to believe they lack ability in the relevant domain, they do not expect to be able to perform well in the future, and they fail to fully reap the affective fruits of their success. However, this often maladaptive response can be disrupted by a new social influence technique we have termed directed abstraction, which helps participants with negative self-views generalize more broadly from a success experience than they otherwise would. Of the many behavioral benefits such a technique might have, we have demonstrated one, increased persistence following failure, and perhaps because failure can be threatening for those with positive and negative self-views alike, this final benefit seems not to depend on initial self-views.

Besides clarifying how people with negative self-views react to success, we hope that the current work will prove useful in a variety of practical applications. For example, exposure treatment for specific phobias is generally more effective in the short term than in the long term (e.g., Vervliet, Craske, & Hermans, 2013). Perhaps the directed abstraction technique we have developed could supplement exposure treatment by helping people generalize from their success controlling their fear during treatment (Jones, Fazio, & Vasey, 2011) to more abstract outcomes such as self-beliefs, approach motivation, or attitudes toward the feared object (which may predict return of fear; Vasey et al., 2012). With regard to fear of public speaking in particular, one critical element of exposure treatment is highlighting the discrepancy between a speaker's expectations or beliefs about the quality of his or her performance and the actual quality of the performance (Rodebaugh et al., 2010); in fact, this kind of mismatch between an expectation and

an outcome is central in reducing any kind of learned association (e.g., Craske et al., 2008; Rescorla, 2006). The current research suggests that it may not be enough to make such a discrepancy salient; it is also important that one considers the broad, abstract implications of that discrepancy.

Directed abstraction may also be useful in the classroom. Short social-psychological interventions can improve academic achievement by combating identity threat (e.g., Sherman et al., 2013) and by altering students' lay theories about the causes of grades (Wilson & Linville, 1985). Directed abstraction may be able to achieve similar results by encouraging students to view themselves as academically competent and thus capable of improving low grades. This technique seems perfectly suited to encourage women to pursue advanced training and careers in STEM fields (science, technology, engineering, and math). The gender disparities in these fields are likely due not to gender differences in ability, but rather gender differences in beliefs about one's ability (Stout, Dasgupta, Hunsinger, & McManus, 2011). A directed abstraction manipulation following a successful performance in a STEM class could bolster women's perceptions of their abilities in STEM domains, and this change could have cascading effects on future outcomes, such as choosing whether to pursue a career in STEM. Future work should explore these possible uses of directed abstraction, which has clear potential to be a powerful method of boosting people's negative self-views to better match their actual abilities.

Table 1
Regression predicting Generalization Composite in Experiment 1

	Predictor	B	t	p
Step 1	Intercept	-.13	-.91	.37
	Condition	.26	1.32	.19
	SC	.40	3.99	.00
Step 2	Intercept	-.14	-1.05	.30
	Condition	.27	1.36	.18
	SC	.66	4.49	.00
	Cond x SC	-.46	-2.36	.02

Note. SC = Self-Competence, Cond x SC = Condition by Self-Competence interaction. SC and Generalization Composite are standardized and Condition is dummy-coded (0 = control, 1 = directed abstraction).

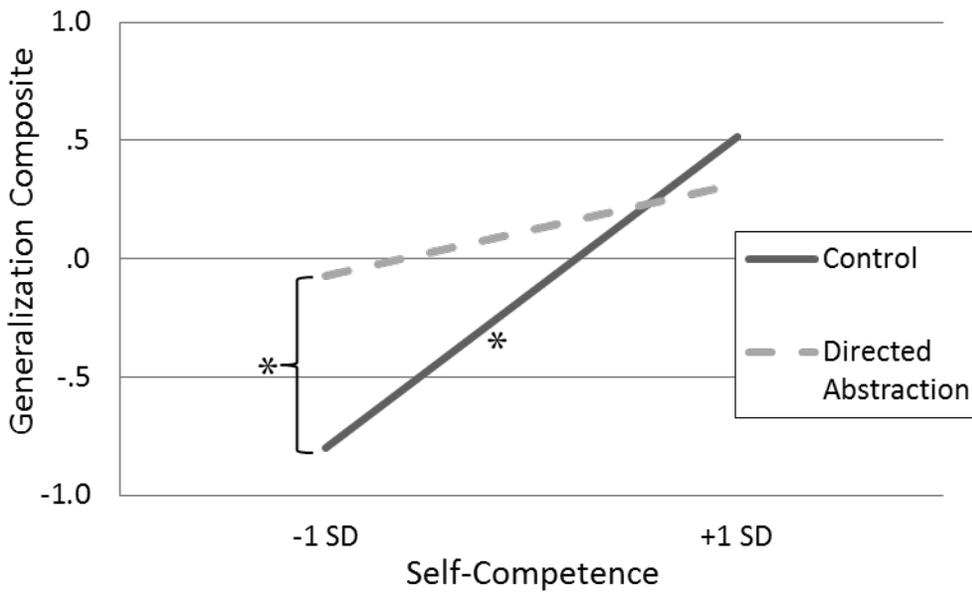


Figure 1. Generalization Composite scores in Experiment 1 predicted by Condition, Self-Competence, and their interaction. * $p < .05$.

Table 2
*Regression predicting Generalization Composite
 in Experiment 2*

	Predictor	B	t	p
Step 1	Intercept	.00	.00	1.00
	Past Exp.	.47	8.58	.00
	Success	.44	8.05	.00
Step 2	Intercept	-.03	-.44	.66
	Past Exp.	..46	9.09	.00
	Success	.32	5.78	.00
	Condition	.06	.62	.54
	SC	.27	5.45	.00
Step 3	Intercept	-.03	-.42	.67
	Past Exp.	.45	9.01	.00
	Success	.31	5.77	.00
	Condition	.05	.61	.54
	SC	.38	5.69	.00
	Cond x SC	-.21	-2.40	.02

Note. SC = Self-Competence, Past Exp. = Past Experience, Cond x SC = Condition by Self-Competence interaction. Past Exp., Success, SC, and Generalization Composite are standardized, and Condition is dummy-coded (0 = control, 1 = directed abstraction).

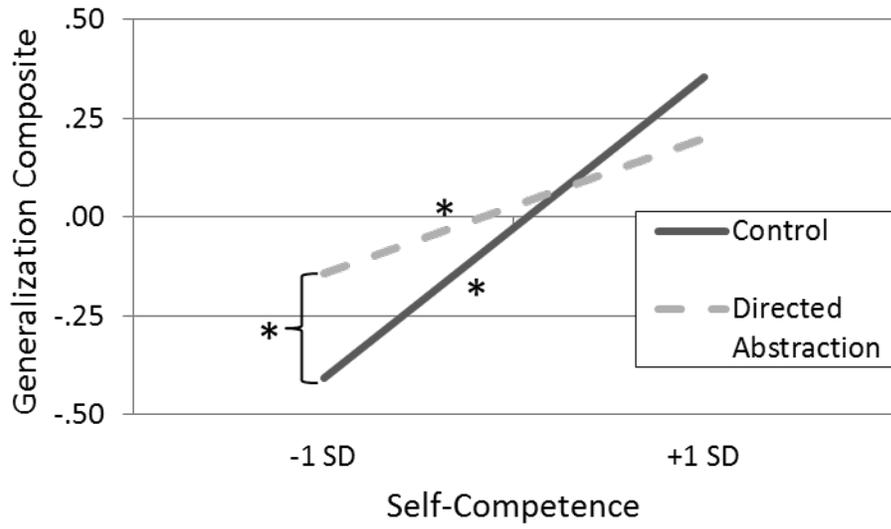


Figure 2. Generalization Composite scores in Experiment 2 predicted by Condition, Self-Competence, and their interaction (controlling for Past Experience and Success). * $p < .05$.

Table 3

Persistence by Condition in Experiment 4

	Switched	Persisted	Total
Control	27	6	33
Directed abstraction	18	13	31
Total	45	19	64

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