Asking students to recall success may not enhance their perceived self-efficacy.

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Asking Students to Recall Success may not Enhance Their Perceived Self-Efficacy

Abstract

The aim of this study was to discover whether asking students to recall success ("solicited ME recall") enhances PSE for an important skill – writing ideation. In Experiment 1, students were randomly assigned to one of three conditions: (i) Solicited Focal ME recall, (ii) Solicited Non-Focal ME recall, or (iii) a control group. It was hypothesised that solicited *focal* ME recall (i.e. recall concerning the skill-in-question) leads to higher PSE than the Non-Focal or control condition. In addition, it was hypothesised that ease-of-retrieval (i.e. the ease/difficulty with which examples are recalled) is associated with posttest PSE during solicited ME recall. Although mean PSE was highest in the Focal ME recall condition, effect sizes were extremely small and differences were not statistically significant. Ease-of-retrieval predicted posttest PSE, but this relationship did not appear to depend on condition. In Experiment 2, students were randomly assigned to either the Focal ME recall or control condition. Results suggested that baseline PSE does not moderate the effect of the intervention on PSE. Although posttest PSE was higher in the ME recall than in the control condition, the effect size was again very small and the difference was not statistically significant. When baseline PSE was controlled, ease-of-retrieval continued to predict posttest PSE. The interaction between ease-of-retrieval and condition (in predicting posttest PSE) was close to statistical significance. This study suggests that asking students to recall success may not be enough to raise their PSE. This has extremely important implications for educators, schools and commentators alike.

Keywords: perceived self-efficacy; mastery experience; ease-of-retrieval; writing

Popular sources across multiple domains assert that recalling success enhances self-belief (e.g. Doss, 2007; Green, 2013; Meier & Knoester, 2017; Palladino, 2007; Sharp, 2014; Sollecito & Johnson, 2013). Similarly, countless books in education recommend that students and teachers in need of a confidence boost should be reminded of past success (Cash, 2016; Cross, 2011; Matthews, 2012; Tschannen-Moran & Tschannen-Moran, 2010). Bandura's theory of perceived self-efficacy (PSE) would appear to support these recommendations. For example, Bandura (1997, p.86) argues that "[s]elective self-monitoring can enhance beliefs of personal efficacy if one's successes are especially noticed and remembered." It is therefore widely assumed that asking students to recall success enhances their PSE. The primary aim of the present study was to examine that assumption in the context of PSE for writing. The value of the examination becomes clear when one considers (a) the importance of enhancing writing PSE, (b) the almost universal faith in "Recall Success," and (c) the cost of widespread reliance on an ineffective approach. If asking students to recall success does *not* enhance PSE, then educators may be wasting their resources and time. Students and teachers would then be well advised to adopt a different approach or to consider how recollections of success may be rendered more effective.

Perceived Self-Efficacy for Writing

Bandura (1977, p.193) defined perceived self-efficacy (PSE) as 'the strength of people's convictions in their own effectiveness.' Since then, PSE has often been understood as a form of confidence. For example, Pajares (2002) defines PSE as 'the confidence that one has in one's ability to do the things that one tries to do.' In their paper on PSE for writing, Bruning et al. (2013, p.25) understand self-efficacy beliefs as 'confidence that one can perform successfully in a particular domain.' Many other researchers also equate PSE with task-

specific confidence (e.g. Latham & Brown, 2006; Morisano, 2013; Schunk, 1995; Shell et al., 1989; Zimmerman, 2000). It should be noted that Bandura (1997) objected to the equation of PSE with (general) 'confidence.' Nevertheless, Bandura himself operationalises PSE in terms of *task-specific* confidence (Bandura, 2006) – the approach taken in the present study. Some authors define PSE in terms of confidence in 'abilities' (e.g. Pajares, 2002), whereas others speak of '*cap*-abilities' instead (e.g. Schunk, 1995). No distinction is drawn between 'abilities' and 'capabilities' in the present study.

A great deal of PSE research has focused on writing. PSE for writing skills is positively associated with writing performance (e.g. McCarthy et al., 1985; Pajares et al.,1999; Pajares & Johnson, 1994; Shell et al., 1989; Shell et al., 1995). In a path-analytic study involving high school students, Pajares and Johnson found that writing aptitude had a direct effect on PSE for writing skills. Aptitude also had an indirect effect on performance, predominantly through PSE. Even after controlling for aptitude, however, PSE for writing skills had a strong effect on performance. The authors conclude that "teachers have the dual responsibility of increasing students' competence *and* confidence" (Pajares & Johnson, 1996, p. 172). Crucially, PSE predicts writing performance even after controlling for major covariates such as writing ability or previous writing performance (Pajares et al., 2007).

In order to understand what might enhance writing PSE, the sources of PSE should be considered (e.g. Bandura, 1997). These are: 1) mastery experience (ME), 2) vicarious experience, 3) social persuasion, and 4) physiological and affective states. Statistical analyses (e.g. multiple regression) have shown that ME is a stronger and more consistent predictor of student PSE than all of the other three sources (e.g. Usher & Pajares, 2009). ME appears to be particularly important for writing skills. For example, a large study involving students at

elementary, middle and high school level ($N = 1256$) explored the influence of the four sources on students' PSE for writing (Pajares et al., 2007). Although there were statistically significant correlations between each of the four sources and writing PSE, perceived *mastery experience* accounted for the largest proportion of the variance. This was true for both boys and girls across all scholastic levels. In fact, ME accounted for more unique variance in writing PSE than all of the other sources combined. Moreover, amongst high school students, only ME and social persuasion predicted writing PSE. The researchers also found evidence to suggest that PSE for writing skills declines as students progress from elementary to middle school and then remains at a lower level during high school. In addition, several researchers have observed that the decline in writing PSE may be greater in girls than boys (e.g. Bruning & Horn, 2000; Klassen, 2002; Pajares & Johnson, 1996). High school students - and girls in particular- may therefore require a boost in writing PSE. Moreover, research suggests that the source of that boost could in fact be ME.

Enhancing PSE Through ME

Several interventions have attempted to engineer ME with a view to enhancing PSE (e.g. Luzo et al., 1999; Kudo & Mori, 2015; Reubsaet et al., 2003). These may be described as *direct* ME manipulations in so far as researchers actually contrive participants' success. An alternative *indirect* approach involves asking participants to recall their own previous success (e.g. Sharma & Morwitz, 2016) - an approach hereafter referred to as "solicited ME recall." There are both theoretical and empirical reasons to suppose that solicited ME recall may be effective. Bandura (1997, p.86) suggests that PSE is enhanced "by selective focus on personal attainments." Schunk and Hanson (1989) found that students who watched themselves succeeding on video developed higher PSE than students who did not observe their own success. Solicited ME recall may be similar to watching a video of one's own success. Both

manipulations should make previous ME salient, which should subsequently enhance PSE. Several studies do indeed indicate that recollections of success can boost confidence or PSE (e.g. Brown et al., 2016; Nelson & Knight, 2010; Sharma & Morwitz, 2016). It has also been suggested that "a self-schema of being a self-efficacious person would be linked to memories of achievements of success" (Krans et al., 2018, p.3).

Solicited ME Recall and Ease-Of-Retrieval

A great deal of research indicates that the ease or difficulty with which content is recalled - "ease-of-retrieval" - has an effect on people's judgements. For example, Vaughn (1999) asked some college students to think of 3 ways to improve test performance (relatively easy retrieval) and others to think of 8 ways (difficult retrieval). Students' PSE for tests was then measured. When students were unsure of their future performance those required to engage in *difficult* retrieval reported lower PSE than those engaging in easier retrieval. In another highly relevant study, researchers explored the effects of ease-of-retrieval during solicited ME recall (Fuller et al., 2013). Students asked to recall three instances of academic success (relatively easy retrieval) reported more positive assessments of their ability than students asked to recall nine instances (difficult retrieval). It therefore seems that ease-of-retrieval may affect both solicited ME recall and student PSE. If students find it difficult to retrieve examples of success they may draw negative conclusions about their abilities. Conversely, the easier students find it to recall success the higher their expected PSE.

Solicited ME Recall and the "Spreading" of PSE

Self-efficacy beliefs vary from skill to skill within a given domain. A student may have high PSE for "ideation" (generating and expressing ideas) but low PSE for "conventions" (e.g. appropriate use of punctuation). Measures of writing PSE are therefore very specific (e.g. McCarthy et al., 1985; Shell et al., 1989). Nevertheless, Bandura (1997) himself acknowledges that PSE may generalise or "spread" across skills or tasks. This "spreading" occurs, for example, when the skills required to perform one task are similar to those required for another (Bandura, 1997; Pajares, 1997). Several studies have indeed found that success in one area may lead to enhanced PSE in another (e.g. Samuels & Gibb, 2002; Taniguchi et al., 2017; Widmer et al., 2014). In one study involving students aged 17-23, researchers examined the impact of outdoor risk-taking (Taniguchi et al., 2017). Perhaps unsurprisingly, participation in outdoor activities enhanced PSE for outdoor risk-taking. In addition, however, students taking part in outdoor activities experienced an improvement in PSE for risk-taking *in writing*. PSE has been found to "spread" in similar fashion for adolescent students as young as 13 (e.g. Widmer et al., 2014).

The "spreading" of PSE may be relevant for solicited ME recall. Specifically, it may be that asking students to recall ME of *one* skill enhances PSE not only for that skill but also for other related skills. This has extremely important implications. If PSE is as narrow and specific as some have suggested, then a school might have to devise one PSE intervention for spelling, another for grammar, yet another for punctuation and so on. On the other hand, if (under certain conditions) PSE "spreads", then raising PSE for one skill (e.g. writing conventions) might be sufficient to raise it for another (e.g. writing ideation). A single PSE intervention might then have positive downstream effects - a highly desirable outcome.

Previous Studies of Solicited ME Recall

Given the importance of student PSE and the link between PSE and ME, it might be assumed that a great deal of research has examined solicited ME recall. This is not the case. Only a few relevant studies could be identified. In one study (Snyder et al., 1996), students engaging in solicited ME recall reported a statistically significant increase in state "hope" - a construct akin to general PSE (Zhou and Cam, 2016). Participants appear to have been university undergraduates but the researchers do not report their age. However, they do report that no main or interaction effects were found involving gender. Solicited ME recall may therefore be equally effective for male and female students. However, it should be remembered that state hope is not the same as *skill-specific* PSE. Another study involving college students focused specifically on test-taking (Nelson and Knight, 2010). Compared to students in a control group, students randomly assigned to a ME recall condition reported greater optimism, lower test anxiety and more confidence in their ability to take a test. Students in the solicited ME recall condition were not asked to think specifically about success on previous tests. Rather they were invited to recall success in *any* previous challenge. This provides further evidence that PSE may spread from one task to another. However, the researchers measured confidence for a particular "pop quiz". It would be better to measure PSE for a more widely applicable skill (e.g. ideation) using a validated measure such as the Self-Efficacy for Writing Scale (Bruning et al., 2013). Other studies suffer from similar limitations. Sharma and Morwitz (2016) found that relative to a "failure recall" condition, solicited ME recall led to higher PSE. However, the researchers measured general rather than skill-specific PSE. In addition, the lack of a neutral control group makes it difficult to interpret results. The group difference in posttest PSE may have been due to the positive

effect of solicited ME recall. Equally, however, it may have been due to the *negative* effect of solicited failure recall. Moreover, Sharma and Morwitz's (2016) experiment involved older adults rather than college or high school students.

Finally, it should be noted that some studies of solicited ME recall have not detected any effects on PSE. Occasionally the manipulation is little more than a rapid case of priming: individuals are briefly reminded of a previous success before reporting their PSE. De Lucia (2015) provides a good example of this approach. Participants were asked to recall either an academic success or an academic failure. They then indicated how vivid their image was before rating their level of confidence for completing anagrams. It was predicted that participants who underwent the past academic success prime would report higher levels of confidence than participants undergoing the failure prime. However, the difference was not statistically significant. A rapid priming procedure may therefore not be enough to enhance PSE for a (possibly unrelated) skill. The precise age of participants was not ascertained but the researcher states that the likely range was 17-21.

In summary, previous studies suggest that solicited ME recall may enhance students' sense of hope, optimism and self-efficacy. However, there are numerous limitations in the existing evidence-base. First, several experiments have manipulated or measured *general* rather than specific PSE. Second, some studies have used a "failure" comparison condition rather than a neutral control group. Finally, it is not clear how much processing of the success is necessary. De Lucia's (2015) study suggests that minimal priming may not be enough to affect PSE. Some researchers have asked participants to explain *why* they were able to achieve their past success (Zunick et al., 2015). Others have asked participants to write about their success but have not given any other instructions (Sharma and Morwitz, 2016). Others have taken

participants through a guided visualisation (Snyder et al., 1996). Precisely what components are required is unknown. In addition, previous studies of solicited ME recall have involved college students or adults. It is important to discover whether findings extend to high school students.

The Present Study

The present study investigated the effects of solicited ME recall on PSE for writing ideation. Experiment 1 compared two forms of solicited ME recall - *Focal* ME recall (i.e. recall of ME in writing ideation) and *Non*-focal ME recall (i.e. recall of ME in writing conventions). Previous studies of the "spreading" hypothesis have explored apparently quite disparate domains, e.g. risk-taking in outdoor activity and risk-taking in writing (Taniguchi et al., 2017). In the present study two closely related skills were chosen: "writing ideation" and "writing conventions". Researchers have reported a substantial correlation between PSE for ideation and PSE for conventions (Bruning et al., 2013). Moreover, both skills may depend on a similar self-regulatory mechanism. For example, taking the time to find the right words for one's ideas ("ideation") is not dissimilar to paying attention to one's spelling and grammar ("conventions"). This would help to explain the association between "ideation" and "conventions" PSE.

Bandura (1997) argues that PSE is enhanced when individuals selectively focus on past achievements and when relevant successes are recalled. It was therefore hypothesised that solicited Focal ME recall enhances PSE relative to a control condition. Moreover, it was hypothesised that *Focal* ME recall has a greater effect than Non-Focal recall. Focusing *specifically* on ME in ideation should have a more pronounced effect on PSE for ideation

than focusing on a different-but-related skill – conventions. However, given that PSE may "spread" from one skill to another (if those skills are related), it was hypothesised that Non-Focal ME recall has a positive effect on PSE relative to a control condition. These hypotheses may be expressed thus: Focal ME recall > Non-Focal ME recall > Control.

It was also hypothesised that the relationship between ease-of-retrieval and posttest PSE depends on condition: among students engaged in Focal ME recall, ease-of-retrieval is positively associated with posttest PSE but among students in the control group no such relationship exists. Students in ME recall conditions are asked to recall examples of their own success. Ease or difficulty in retrieving such examples is likely to be seen as diagnostic (*"It's hard to think of a time when I did this well, so there can't be many times when I've done this well. That means I probably can't do this well"*). Ease-of-retrieval should therefore be related to posttest PSE. Students in the control condition, on the other hand, are merely asked to note a type of work *requiring* ideation. Ease or difficulty in this task presumably tells students little about their own capabilities. There should therefore be no association between ease-of-retrieval and PSE in the control group.

Experiment 2 sought to build on Experiment 1. The primary aim was to test whether the effect of solicited ME recall is moderated by baseline PSE. The secondary aim was to examine whether ease-of-retrieval is positively associated with posttest PSE *even after controlling for baseline PSE.* Once again, however, the relationship was expected to exist only among students engaged in ME recall. In both experiments, ease-of-retrieval was expected to be lower in the ME recall conditions than in the control group. Recalling a personal example of success in ideation is presumably more difficult than merely noting a

type of work requiring ideation. The entire study was approved by the Ethics Committee at [name of university redacted].

Experiment 1

Participants

120 students in a private girls-only secondary school in London participated in Experiment 1. Participants were a convenience sample and their mean age was 15.4. All students were aged between 14 and 15 (SD = 0.58). Students were pursuing a wide range of subjects most of which involved some form of writing (e.g. History, English, Geography). All participants provided informed consent and none opted out of the study. Participants attended a selective school with high academic standards. Some students in the school were considered to have "individual learning needs" but none were deemed to have major learning disabilities or severe difficulties with reading or writing. No students in the school were excluded from the study on the basis of individual learning needs.

The research was deemed by all relevant school leaders to fall within the range of normal school activities and no ethical issues were identified. Parental consent was therefore not required (British Psychological Society, 2014). Participants were randomly assigned to one of three conditions: 1) Control Group (n = 40), 2) Non-Focal ME Recall (n = 40), 3) Focal ME Recall (n = 40). Participants were unaware that there were different conditions (until they were debriefed at the end of the study).

Measures

PSE for Writing Ideation.

This was measured using the "writing ideation" subscale of the Self-Efficacy for Writing Scale - SEWS (Bruning et al., 2013). Participants reported their confidence for each skill from 0% ("Cannot do at all") to 100% ("Totally certain I can do"). Internal consistency was high ($\alpha = .87$)

Ease-Of-Retrieval.

Ease-of-retrieval was measured on two dimensions, (i) how easy it was to think of the example, and (ii) how easy it was to recall the details (Lammers et al., 2017). The correlation between the two items was reasonably strong ($r = .61$, $n = 120$, $p < .001$). Ease-of-retrieval was calculated as the mean of the scores on the two items. Students responded on a scale from 0 to 10, with higher scores indicating greater ease-of-retrieval.

Procedure

Students completed the study during PSHE (Personal, Social, Health & Economic) lessons. The experimental materials took the form of "writing surveys," which were distributed by teachers. All surveys had the same front cover ("Participant Information") so that teachers and students were blind to condition. Teachers asked students to complete the surveys independently, in silence. They had no other interaction with students during the intervention. After reading the participant information and indicating consent, students turned over the page. At this point materials differed according to condition.

Focal ME Recall Condition

Students in the Focal ME recall condition were given the following prompt: "Please think of one piece of work you've done in which you (a) came up with good ideas and (b) expressed your ideas well in writing." They were then told that it could be any piece of writing from any time period (e.g. last week, last month etc.). Students were then asked to describe the piece of writing in a few words (e.g. "A History assignment"). Participants were then asked to picture the piece of work as vividly as possible whilst thinking about "how *well* [they] came up with ideas and expressed those ideas in writing." Participants were then required to indicate the extent to which they had (i) "come up with quite a few ideas" (ii) "thought of some original ideas", (iii) "found good words to express [their] ideas", and (iv) "put [their] ideas in the right places in [their] writing." These focus-points corresponded directly to the items on the PSE for ideation scale. After this, participants were asked to take a moment to "consider what that successful piece of writing says about [their] writing skills *in general."* Previous research suggests that generalisation from success is important (Zunick et al., 2015).

Non-Focal ME Recall Condition

Students in the Non-focal ME recall condition were given the following prompt: "Please think of one piece of writing you've done in which you (a) spelt words correctly and (b) used good punctuation and grammar." They were told that it could be any piece of writing from any time period. Students were asked to describe the piece of writing in a few words. Participants were then asked to picture the piece of work as vividly as possible whilst thinking about "how *well* [they] had followed writing conventions." They were then required to indicate the extent to which they had (i) "spelt [their] words correctly, (ii) "applied good punctuation," (iii) "used correct grammar," and (iv) written "accurately in complete

sentences." Participants were then asked to "consider what that successful piece of writing says about [their] writing skills *in general.*"

Control Condition

Students in the control group were given the following prompt: "Please think of one type of work for which it is necessary to (a) come up with good ideas and (b) express those ideas well in writing." They were told that it could be any type of work from any time period. Students were asked to describe the type of work in a few words (e.g. "History assignments"). They were then asked to picture this type of work as vividly as possible whilst thinking about "how *important* it is to come up with ideas and express those ideas well in writing." They were then required to indicate how valuable it is (for the type of work they identified) to (i) "come up with quite a few ideas," (ii) "think of some original ideas," (iii) "find good words to express ideas, and (iv) "put ideas in the right places in writing." The four focus-points corresponded to the items on the PSE for writing ideation scale. However, unlike students in the Focal ME recall condition, students in the control group were not asked to recall their own success.

After going through the condition-specific prompts (above), all students completed the PSE for ideation scale (Bruning et al., 2013) and the ease-of-retrieval measures.

Results

Posttest PSE Across Conditions

Posttest PSE means and standard deviations are displayed in Table 1. A one-way ANOVA indicated that the effect of condition on PSE was not statistically significant, $F(2, 117) =$

0.22, $p = .80$, $\eta^2 = 0.00$. Nevertheless, Cohen's *d* was used to estimate effect sizes. The Focal ME recall condition had higher mean PSE than the control condition but the "advantage" was extremely small ($d = 0.08$). Similarly, mean PSE was higher in the Focal than Non-Focal condition, but the difference was small ($d = 0.14$).

Table 1. Posttest PSE Means and Standard Deviations for the Control Group, Non-Focal ME Recall Group and Focal ME Recall Group

	M	*SD*
Control ($n = 40$)	65.45	12.90
Non-Focal ME Recall ($n = 40$)	64.48	13.78
Focal ME Recall ($n = 40$)	66.55	15.18

PSE = Perceived self-efficacy
ME = Mastery experience

Group Differences in Ease-Of-Retrieval

Table 2 displays ease-of-retrieval means and standard deviations. A one-way ANOVA yielded a statistically significant effect of condition on ease-of-retrieval, $F(2,117) = 11.76$, $p < .001$, $\eta^2 = .17$. Planned pairwise comparisons using Fisher's LSD indicated that ease-of-retrieval was lower in the ME recall conditions than in the control group. However, the magnitude of the effect was unexpected: the difference in ease-of-retrieval between the Focal ME recall and control group was larger than one standard deviation (Cohen's $d = 1.07$).

Table 2. Ease-Of-Retrieval Means and Standard Deviations for the Three Conditions.

	M	*SD*
Control (*n* = 40)	7.79	1.55
Non-Focal ME Recall (*n* = 40)	6.46	1.78
Focal ME Recall (*n* = 40)	6.03	1.74

PSE = Perceived self-efficacy
ME = Mastery experience

The Relationship Between Ease-Of-Retrieval and Posttest PSE

The relationship between ease-of-retrieval and posttest PSE was expected to differ across groups. To test for an interaction between condition and ease-of-retrieval (EOR), hierarchical moderated multiple regression was used (Aiken & West, 1991). Two dummy variables were created to code the conditions. Two product terms were then created by multiplying each dummy variable by EOR. In the first block, EOR and the dummy variables were entered simultaneously. The product terms (testing for the interaction) were then entered in the second block. The change in R^2 when the product terms were added was not statistically significant, $F(2,114) = 1.38$, $p = .26$, $\Delta R^2 = .01$. The individual coefficients for the interaction terms were also not statistically significant. There was therefore no evidence that the relationship between ease-of-retrieval and posttest PSE differs across conditions. The interaction terms were dropped from the model and posttest PSE was regressed on ease-of-retrieval and the dummy variables. The overall regression was statistically significant, $F(3,116) = 25.24$, $p < .001$, $R^2 = .40$. The standardised regression coefficient (β) for ease-of-

retrieval was also statistically significant ($t = 8.67$, $p < .001$). The value was .69 - a large 'effect' by many criteria (e.g. Keith, 2019).

Discussion

Posttest PSE

Contrary to expectations, the effect of condition on posttest PSE was not statistically significant. Solicited ME recall apparently did little (or nothing) to raise PSE compared to the control group. In addition, Focal ME recall did not appear to be (much) more effective than Non-Focal. Some explanation is required. One possibility relates to *baseline* PSE. For example, students low in baseline PSE may have benefited from solicited ME recall whilst students high in baseline PSE did not (or vice versa). This would result in a dilution or "cancelling-out" effect. Research does suggest that the positive effect of past success on PSE is greater for individuals *low* in general PSE (Chen et al., 2001). Solicited ME recall might therefore be more effective for students low in PSE. On the other hand, individuals with low views of their own competence may fail to generalise from their successes (Zunick et al., 2015). Solicited ME recall might therefore be more effective for students *high* in PSE.

Ease-Of-Retrieval and Posttest PSE

Group differences in ease-of-retrieval were as expected. Mean ease-of-retrieval was lower in the ME recall conditions than in the control group and differences were statistically significant. Recalling an example of success in ideation appears to be more difficult than thinking of a type of work for which ideation is important. This serves as a reminder that "indirect" ME manipulations (requiring recollections of success) may be less straightforward than direct manipulations in which success is engineered.

The association between ease-of-retrieval and posttest PSE was expected to differ across groups. However, the interaction between condition and ease-of-retrieval was not statistically significant. Controlling for condition, however, there was a positive association between ease-of-retrieval and posttest PSE. This may appear to suggest that ease or difficulty in retrieval *causes* higher or lower PSE. However, the direction of causality may be the reverse: (baseline) PSE may affect ease-of-retrieval. That is, students who are more/less confident of their skills may find it easier/more difficult to recall examples. Research does indeed suggest that one's level of PSE affects one's ability to recall the past (e.g. Brown et al., 2012).

One of the main limitations of Experiment 1 was the absence of a measure of baseline PSE. The association between ease-of-retrieval and posttest PSE was therefore difficult to interpret. In addition, the "true" effect of solicited ME recall might be obscured by variations in baseline PSE. Students in Experiment 1 were also younger than participants in previous studies. The purpose of Experiment 2 was therefore threefold: 1) to determine whether baseline PSE moderates the effect of solicited ME recall on posttest PSE, 2) to examine whether ease-of-retrieval still predicts posttest PSE when baseline PSE is controlled, and 3) to test the effect of solicited ME recall in a slightly older sample of students (closer in age to participants in previous studies).

Experiment 2

Participants

102 female students aged between 16 and 17 were initially recruited for Experiment 2. However, 2 students opted out of the study. Participants were a convenience sample and

attended the same school as participants in Experiment 1. Their mean age was 17.2 (SD = 0.59). Participants were studying a wide range of subjects most of which involved writing (e.g. History, Philosophy, Economics). Although some students in the sample were listed as having "individual learning needs," no students had major learning disabilities or severe difficulties with reading or writing. As a result, no students were excluded from the study on the basis of individual learning needs. Participants had previously completed the PSE for writing ideation scale (providing baseline measures). Students were randomly assigned to either the (1) control group (n = 51) or (2) Focal ME recall group (n = 49).

Measures

PSE for Writing Ideation

As in Experiment 1, this was measured using the 'writing ideation' subscale of the Self-Efficacy for Writing Scale - SEWS (Bruning et al., 2013). Internal consistency was high (a = .81).

Ease-Of-Retrieval

Ease-of-retrieval was measured using the same items used in Experiment 1. The correlation between the two items was smaller than in Experiment 1 but still large if judged by Cohen's (1988) thresholds (r = .53, n = 100, p < .001).

Procedure

The procedure was the same as in Experiment 1, except for the fact that the *Non*-Focal condition was not included. It did not seem appropriate to ask older adolescents to reflect on mastery of spelling and punctuation. Furthermore, reducing the number of groups from three

to two and concentrating participants in the two conditions predicted to differ the most (Focal ME recall and Control) was expected to result in greater statistical power (e.g. Lipsey, 1990). The "writing surveys" were distributed by teachers and completed before normal lessons.

Results

Table 3 displays pretest and posttest PSE means and standard deviations for both groups. There was a strong positive association between pretest and posttest PSE as indicated by a standardised beta coefficient of .59 ($t = 5.17$, $p > .001$).

Table 3. Pretest and Posttest Means and Standard Deviations for PSE-For-Ideation

	Pretest		Posttest	
	M	*SD*	*M*	*SD*
Control ($n = 51$)	65.96	11.09	66.84	8.60
Focal ME Recall ($n = 49$)	63.35	11.21	67.06	10.04

PSE = Perceived self-efficacy

ME = Mastery experience

Baseline PSE, Moderation and Posttest PSE

Moderated multiple regression was used to determine whether the effect of solicited ME recall on posttest PSE is moderated by baseline PSE. Recall condition was dummy-coded. Posttest PSE was then regressed on baseline PSE, condition and their product. The overall regression was statistically significant, $F(3, 96) = 19.31$, $p < .001$, $R^2 = .38$. However, the coefficient for the product term was not: $b = 0.06$, $t = 0.47$, $p = .64$. The product term was therefore dropped and the model re-estimated (Hayes, 2018). The overall regression was statistically significant, $F(2, 97) = 29.09$, $p < .001$, $R^2 = .38$. However, the coefficient for condition was not ($b = 1.56$, $t = 1.04$, $p = .30$). Thus, controlling for baseline PSE, the between-condition difference in posttest PSE was not statistically significant. An effect size estimate was calculated using the approach recommended by Morris (2007). The mean pre-post change of the control condition was subtracted from the mean pre-post change of the experimental condition and the result was divided by the pooled pretest standard deviation. This yieled a value of 0.25 – a small "effect". Cohen's *d* calculated from posttest data alone yielded a value of 0.02 – even smaller than the "effects" in Experiment 1.

Group Differences in Ease-Of-Retrieval

Table 4 displays ease-of-retrieval means and standard deviations. An independent samples *t*-test indicated that ease-of-retrieval was lower in the ME recall group than in the control group and the difference was statistically significantly: $t(98) = 4.38$, $p = <.001$. The size of the effect was large (Cohen's $d = 0.87$).

Table 4. Ease-Of-Retrieval Means and Standard Deviations for the Control and ME Recall Group

	M	*SD*
Control (*n* = 51)	8.02	1.34
Non-Focal ME Recall (*n* = 49)	6.90	1.22

ME = Mastery experience

The Relationship Between Ease-Of-Retrieval and Posttest PSE

Condition was dummy-coded as before. A product term was created by multiplying the dummy variable by ease-of-retrieval. Posttest PSE was then regressed on baseline PSE, condition, ease-of-retrieval and the product term. The overall regression was statistically significant, $F(4,95) = 19.38$, $p < .001$, $R^2 = .45$. However (although close), the coefficient for the interaction was not: $b = 1.94$, $t = 1.73$, $p = .09$.

The interaction term was dropped and posttest PSE was regressed on baseline PSE, condition and ease-of-retrieval. The overall regression was statistically significant, $F(3,96) = 24.35$, $p < .001$, $R^2 = .43$. The standardised regression coefficient for ease-of-retrieval was .27, which was also statistically significant ($t = 3.11$, $p < .01$). If Keith's (2019) rules of thumbs are applied, this may be considered a large "effect."

Discussion

Posttest PSE and Moderation

One of the primary aims of Experiment 2 was to investigate whether the effect of solicited ME recall on posttest PSE is moderated by baseline PSE. No firm hypothesis was advanced but previous research had suggested that manipulations based on success might have differential effects depending on people's initial level of confidence, PSE or self-esteem (Chen et al., 2001; Wood et al., 2005; Zunick et al., 2015). Nevertheless, there was no good evidence for moderation. Although the largest sample size available to the researcher was used (N = 100), this may not have been enough if the true moderation effect in the population is small. Aiken and West (1991) discuss the typically low power of multiple regression tests for interactions. Assuming that $\alpha = 0.05$ (the norm), desired power is .80 (a common standard), and there is no measurement error in the predictors, then Aiken and West (1991) estimate that the number of observations required to detect interaction in the case of a small effect is 392 - almost four times the size of the present sample. On the other hand, calculations by Aiken and West (1991) suggest that a sample size of 55 should be enough to detect interaction in the case of a moderate effect. If the true effect in the present case is so small that a sample of 100 students is insufficient to detect it, then it may be of little practical significance to schools.

A more straightforward explanation for the lack of evidence for moderation concerns the manipulation itself. Given largely negligible "effects" across two experiments, it is natural to suppose that the intervention was defective. Although they were more elaborate than the failed priming procedures used by De Lucia (2015), the experimental materials did not include any open-ended questions or attributional prompts. The results – together with those

of De Lucia (2015) - suggest that solicited ME recall without additional support may do little to enhance student PSE. The estimated effect size (for posttest PSE) was 0.25, as compared with just 0.08 in Experiment 1. On the face of it, this might be thought to suggest a larger effect for the older students in Experiment 2. This is not the case. The effect size estimate in Experiment 2 incorporated pretest data. The estimates of Cohen's *d* for Experiment 1, on the other hand, were based on posttest data alone (and were smaller as a result). Moreover, even the larger "effect" in Experiment 2 (0.25) is still considered small by most standards (e.g. Cohen, 1988).

The Relationship Between Ease-Of-Retrieval and Posttest PSE

Experiment 2 further investigated the relationship between ease-of-retrieval and posttest PSE. Unlike Experiment 1, Experiment 2 benefitted from a measure of baseline PSE. With baseline PSE in the model, the interaction between ease-of-retrieval and condition was close to statistical significance. This is consistent with the hypothesis that the relationship between ease-of-retrieval and posttest PSE depends on whether students are engaging in (a) solicited ME recall, or (b) the control task. However, given that the interaction was not statistically significant no further probing was undertaken. Ease-of-retrieval continued to predict posttest PSE even after baseline PSE was controlled. This may be an important point for advocates of solicited ME recall to bear in mind. That is, the *accessibility* of previous success may influence the results of the intervention.

General Discussion

Two experiments were conducted to investigate whether solicited ME recall raises PSE for writing ideation. PSE was operationalised as the confidence that students have in their ability to perform relevant writing tasks, in line with previous research on PSE for writing (Bruning et al., 2013; Pajares, 2007; Shell et al., 1989).

In both cases, recalling examples of success in ideation was more difficult than thinking of types of work *requiring* ideation. This highlights the fact that "indirect" ME manipulations may present more challenges (for students) than interventions in which success is engineered. Nevertheless, the effort required by solicited ME recall might be considered worthwhile if PSE is thereby enhanced. However, solicited ME recall did little or nothing to enhance PSE across the two experiments. Furthermore, there was no evidence of moderation by baseline PSE. These results have extremely important implications for schools and educators. Innumerable popular sources assert that confidence can be enhanced by asking individuals to recall success (e.g. Doss, 2007; Green, 2013; Meier & Knoester, 2017; Palladino, 2007). Moreover, PSE theory - articulated most fully by Bandura (1997) - would seem to support that assertion. However, the results of the present study, as well as those of De Lucia (2015), suggest that reality is somewhat more complicated. Simply asking students to recall success may not enhance PSE.

On the one hand, the limited success (or apparent failure) of solicited ME recall in the present study may be due to the absence of certain prerequisites. For example, students may need help in *attributing* previous success to their own capabilities. Research indicates that appropriate attributional feedback has a positive influence on PSE (e.g. Schunk, 1983;

Schunk & Cox, 1986). Conversely, some evidence suggests that ME recall manipulations that do not include attributional prompts may be less effective than those that do. For instance, one study compared two manipulations - one in which students were merely asked to note *how* they had achieved their success and another in which participants had to explain *why* they were able to achieve it (Zunick et al., 2015). The latter manipulation encouraged internal attributions by requiring students to complete the sentence: 'I was able to achieve a successful performance *because I am*…' (italics added). The researchers found that this manipulation had a positive effect on posttest confidence levels, presumably because of the internal attributions. The lack of explicit attributional prompts in the present study might explain the failure of the manipulation. Future research could test the effects of a more extensive manipulation including attributional prompts (e.g. a sentence-completion task: 'I was able to come up with so many ideas for written work *because I am…*'). In addition, the relationship between ease-of-retrieval and posttest PSE should be borne in mind. It is not only the *content* of the recollection that matters. The accessibility of that content plays a role. Other studies have shown that ease-of-retrieval may affect solicited ME recall and PSE in undergraduates (e.g. Fuller et al., 2013; Vaughn, 1999). The present student extends that finding to high school students. Future studies may therefore wish to explore the effects of *facilitating* retrieval of ME. For example, students might be asked to keep and consult "success journals" (Pajares, 2008). This would largely obviate the need for recollection. Students would merely have to open their journals to be reminded of past success.

The present study is situated in the context of social cognitive theory, particularly the PSE component. However, other literatures may help to explain the results. For example, self-verification theory and research on the self-concept suggest that individuals' self-views are often highly resistant to change (e.g. Swann, 1997; Swann et al., 2007). For example,

Shrauger and Rosenberg (1970) examined the effects of success and failure on students' self-evaluations. On the whole, self-evaluations did become more positive in the success condition. However, students with low self-esteem experienced less of an improvement in their self-concept following "success" than students with high self-esteem. It is important to note that studies such as this involve a "direct" ME manipulation. In other words, success is experimentally engineered. If some students are hardly moved by *experiences* of success, then they are perhaps even less likely to be influenced by recollections. In the present study, the standardised beta for the relationship between pretest and posttest PSE was very large, suggesting that students' self-efficacy beliefs (regarding writing ideation) were extremely stable and perhaps resistant to change.

Limitations of the study must be acknowledged. In both experiments only one PSE variable was measured (PSE for ideation) and no qualitative data were collected. This means that many effects and side-effects of the intervention may have been missed. Research suggests that when individuals struggle to think of positive examples "unrequested cognitions" (e.g. thoughts of failure) may intrude (Tormala et al., 2007). Students in the present study who struggled to recall success may have recalled ideation failure instead. This, in turn, may have lowered PSE. However, without a measure of "unrequested cognitions" this possibility could not be explored. More generally, in the absence of additional data (e.g. qualitative self-reports) the cognitive processes occurring in solicited ME recall could not be investigated in this study. Future research might therefore include qualitative measures and/or explore *un*solicited cognitions.

The generalisability of the findings should also be considered. Participants in the present study were students in a high-achieving independent school. One might therefore wonder

whether their (baseline) PSE was unusually high compared to students in other schools. Perhaps, in addition, this created a ceiling effect. Inspection of the data in Tables 1 and 3 would suggest that this is not the case. PSE means were in the 63-67% range, leaving plenty of room for improvement. Moreover, researchers have reported similar mean scores on the ideation subscale amongst students of the same age in other schools (e.g. Bruning et al., 2013).

However, it may still be wondered whether different results would have been obtained with state school (rather than independent school) students. A study of the psychological characteristics of students in independent schools found that in terms of overall "confidence" there were no statistically significant differences between independent and state school students (AQR, 2017). The researchers did however report that state school students were higher (albeit marginally) on a "confidence in abilities" subscale, which is closer to the PSE construct. In addition, when the researchers examined gender they found that *girls* in state schools had slightly higher confidence in their abilities than girls in independent schools - a fact that might lead state school girls to respond differently to the intervention. On the other hand, it should be remembered that the manipulation was apparently ineffective for students both high and low in PSE. Gender itself should also be considered. The present study examined the effects of solicited ME recall in *female* high school students. Some research suggests that female students in particular may be in need of a boost in writing PSE (e.g. Bruning & Horn, 2000; Klassen, 2002; Pajares & Johnson, 1996). Given that mastery experience (ME) plays a pivotal role in writing PSE, solicited ME recall might be considered a promising approach. However, some research suggests that the sources of PSE may be more or less powerful according to gender. For example, Usher and Pajares (2006) found that girls' academic PSE depended most on social and verbal persuasion whereas boys' PSE

depended primarily on mastery experience (ME). The present ME-based intervention might therefore be more effective with boys than girls - a possibility that could be explored in a future study. In addition, cross-cultural differences may be important. Klassen (2004) argues that self-oriented sources of PSE (e.g. past performance/mastery experience) may have greater weight in individualistic cultures than collectivist cultures. Conversely, in collectivist cultures other-oriented sources (e.g. social persuasion) may weigh more heavily. This would suggest that solicited ME recall is most likely to work in an individualistic culture such as the one in the present study (i.e. a private secondary school in the UK). Nevertheless, it should not be assumed that results obtained in the present cultural context apply without qualification to all others.

Conclusion and Implications

The present study investigated the ubiquitous assumption that asking individuals to recall success enhances their PSE. Results from two experiments cast some doubt on that assumption. Solicited ME recall may be more effective for other skills or domains (e.g. domains in which students' self-views are only just starting to take shape or skills that are relatively new). However, for writing ideation (and no doubt other familiar skills), it would appear that a more powerful intervention is required. Bandura (1997, p.86) suggests that PSE is enhanced "by selective focus on personal attainments." In the light of the present results, that statement might require qualification.

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- *The data underpinning this study are available on request from the author.*

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