The Confidence of Choice: Evidence for an Augmentation Effect on Self-Perceived Performance

Romin W. Tafarodi
University of Toronto

Alan B. Milne
Aberdeen University

Alyson J. Smith
University of Wales, Cardiff

Past research suggests that choice in deciding the features of a task can enhance performance. Independent of the quality of performance, choice may also increase the actor's confidence by providing a secondary source of subjective control during the task. In two studies designed to examine this augmentation hypothesis, college students were asked to read and understand a short story. Study 1 revealed that those who selected names to be used in the story felt more confident about their performance than did those who were assigned names, although the groups in fact performed equally. Study 2 revealed that the enhancement was not due to anticipatory confidence, arguing against the possibility that choice was operating as a performance cue. The findings are interpreted in relation to perceived control and implications for motivation and competence are discussed.

Task confidence has been shown to foster success through a variety of self-fulfilling processes. Given this link between confidence and achievement, close attention has been given to factors that influence the self-judgment of performance. Any characteristic that enhances perceived performance may produce the motivational, cognitive, and behavioral changes that improve actual performance over time (Bardwell, 1984; Markus, Cross, & Wurf, 1990). Self-judgment therefore stands out as a promising point of entry in efforts to promote efficacy. Accordingly, research has focused on situational factors that alter the actor's subjective assessment during task performance. Choice has been identified as one such factor. In this article, we propose a specific judgmental process by which incidental choice boosts the self-perception of performance independent of any immediate effect it may have on actual performance. Before the theoretical rationale for this process is described, the relation of choice to motivation and performance will be briefly reviewed.

Choice and Intrinsic Motivation

Behavior that is intrinsically motivated is engaged in for its own pleasure, without anticipation of secondary rewards. A sense of personal causation—perceiving the locus of causality for one's action to be internal rather than external—appears to be integral to intrinsic motivation (deCharms, 1968/1983). Building on this link, Deci and Ryan (1985) propose that features of an activity affect intrinsic motivation to the extent that they influence the perceived locus of causality for engaging in the activity, increasing or decreasing self-determination accordingly. This self-determination view is consonant with evidence that providing extrinsic rewards for enjoyable activities can sometimes undermine intrinsic motivation, presumably through shifting the perceived locus of determination away from the self and toward an external reinforcer (see Wiersma, 1992, for a review).

The primary vehicle for intrinsic motivation is choice, the most absolute form of which is freedom of engagement. One can engage in an activity while perceiving it to be either compulsory or completely voluntary. In between these two poles lies most of active life, with in-

Authors' Note: This research was supported in part by a Cardiff Research Initiative grant from the University of Wales to the first author. We are grateful to So-Jin Kang and Tuula Kaariainen for their assistance in data collection. Special thanks goes to Debbie Joy for her contribution to pilot research. Correspondence concerning this article should be addressed to Romin W. Tafarodi, Department of Psychology, University of Toronto, 100 St. George Street, Toronto, Ontario, Canada M5S 3G3; e-mail: tafarodi@psych.utoronto.ca.

PSPB, Vol. 25 No. 11, November 1999 1405-1416

dividuals choosing which pressures to conform to and which to resist. The greater the compulsion, the weaker the experienced choice. If self-determination is fundamental to intrinsic motivation, then so too is freedom of engagement, which is essential to self-directed action. Specifically, less freedom of engagement should correspond to lower motivation. To test this expectation, Swann and Pittman (1977) had elementary school children draw with colored markers. Some of the children were told that they had to play with the markers. Others were told that they had other activities to choose from but were then gently induced to opt for the markers. Later, intrinsic motivation for drawing with the markers was gauged as the amount of time the children spent using them during a free choice period. It was found that the illusory freedom of engagement fostered by the gentle inducement led to higher subsequent intrinsic motivation. Using real rather than illusory choice, Zuckerman, Porac, Lathin, Smith, and Deci (1978) obtained similar results. In their study, some college students were allowed to choose which puzzles to work on from a set of possibilities as well as how much time to devote to each puzzle. Other students were simply assigned puzzles and time allotments. Those who had choice exhibited higher subsequent intrinsic motivation for the puzzle-solving task.

Choice, then, appears to support intrinsic motivation. As a form of active control, it provides autonomy and allows the actor to feel self-determining—to feel like an "origin" rather than a "pawn" (deCharms, 1968/1983). This sense of personal causation is essential to wanting to engage in an activity for its own sake.

Choice and Illusory Control

Our discussion so far has focused on performance tasks that require the effort and ability of the actor. However, there are activities, such as games of chance, in which the outcomes are largely independent of these factors. Langer (1975) has argued that providing choice in tasks where outcomes are chance-determined leads to inappropriately heightened expectations of success. She argues that this is due to our cumulative experience with skill-dependent tasks, in which choice often does lead to improved performance, presumably by allowing individuals to tailor the task to their dispositions and abilities. Consistent with this, choice has been found to reduce threat and anxiety in coping contexts (Kukde & Neufeld, 1994; Morrison, Neufeld, & Lefebvre, 1988). In accounting for such effects, choice can be construed as an associative cue that guides the predicted probability of success (Estes, 1976). When choice is provided in a context where success is determined by chance factors, Langer claims, the associative cue inappropriately transfers and expectations of success are boosted in the same way they would be for a skill-based task. The tendency to be insufficiently sensitive to the causal irrelevance of choice for activities involving chance outcomes suggests an illusion of control. The same might be said for ability-dependent contexts in which choices are merely incidental and do not alter the task in any advantageous way. Here, however, the potential impact of choice on actual performance is considerably more complex.

Choice and Performance

Freedom of engagement, we suggested, is closely tied to intrinsic motivation. What of less absolute forms of choice? Admittedly, it is a theoretical leap from freedom to engage in an activity to decisional control over some aspect of that same activity when it is not freely chosen. Even so, the potential for any degree of control to personalize a task suggests that choice among options may provide a modicum of self-determination within the constraints of a compulsory task. If so, then even the most minor choices may enhance motivation and thereby improve performance.

To test this possibility, Perlmuter, Monty, and Kimble (1971) had participants engage in a paired-associate learning task. Participants who were free to choose which of five response words to associate with a stimulus word learned the associations faster than did participants who were simply assigned the response words. Apparently, choice enhanced performance. Similar effects were observed when participants chose the stimulus rather than the response words (Perlmuter & Monty, 1973). An alternative explanation for these results is that choosing stimulus-response pairings provides a mnemonic advantage by allowing participants to form idiosyncratic associative hookups. This alternative, however, cannot account for related studies in which choice of initial pairings also led to faster learning of unchosen pairs in the set (Monty, Rosenberger, & Perlmuter, 1973). Moreover, choosing either the stimulus or the response in the absence of the paired word appears to produce a comparable advantage (Monty & Perlmuter, 1975).

Perlmuter and Monty (1977) argue that choice benefits performance by generally increasing motivation. More specifically, they claim that the perceived control that choice provides improves performance by increasing arousal and sharpening cognitive engagement with all aspects of the task (Monty & Perlmuter, 1987; Perlmuter, Scharff, Karsh, & Monty, 1980). A similar argument is made by Henry (1994; Henry & Sniezek, 1993), who adds that increase in perceived control also fosters self-efficacy. This interpretation fits with the finding that choice provides performance resilience in the wake of initial failure (see Mikulincer, 1988). Any increment in motivation due to incidental forms of choice, however, would affect performance only in proportion to original

intrinsic motivation for the task. That is, the same small increase in motivation would be much more consequential for a task that is not especially motivating to begin with than for one that is already highly motivating. As such, it is not surprising that the more dramatic demonstrations of improved performance due to minor choice have involved lackluster activities, such as solving progressive matrices and paired-associate word learning. For highly engaging and naturally interesting activities, it is likely that the effect would be negligible.

A related motivational explanation for how incidental choice comes to improve performance has been offered by Burger (1987). He suggests that exercising choice can heighten self-presentational concerns and thereby intensify the drive to perform well. Such intensification usually facilitates good performance but can hinder it when accompanied by factors that raise awareness of public evaluation to distracting or anxiety-provoking levels (Burger, 1989). Similarly, choice can actually detract from perceived control under certain conditions. When the chooser feels insufficiently informed or overly rushed to make decisions, choice may be experienced as stressful and, paradoxically, can diminish subjective control and self-confidence (Paterson & Neufeld, 1995; Rodin, Rennert, & Solomon, 1980). In addition, multiple sources of control sometimes yield less benefit than do single sources, suggesting that too much choice may be experienced as undesirable (Mills & Krantz, 1979). For incidental choice that is nonaversive, however, improved performance is likely where there is a significant proportional increase in task motivation. This causal sequence holds implications for confidence.

Choice and Perceived Performance

The correspondence between actual and self-perceived performance in most contexts suggests that those who enjoy choice over features of a task will perceive themselves as doing better insofar as they are led to actually perform better. This describes a causal path from choice through motivation and actual performance to perceived performance. Such a mediated sequence represents an indirect effect of choice on perceived performance. In contrast, Langer's (1975) construal of choice as a performance cue represents a direct cognitive influence of choice on perceived performance. Here, the learned association of choice with better outcomes leads to inflated confidence judgments even where no real performance benefits are realized. Evidence consistent with such an effect has been reported by Henry (1994).

A third, and as yet unexplored, effect is proposed here. Choice may enhance confidence through a combinatory process involving separate sources of perceived control. Initially, the opportunity to determine features of a task may produce a heightened perception of control even before performance begins. This perception, insofar as it persists, will come to overlap with a more primary and potent source of control—the agency of completing the task itself. An actor should be able to distinguish these two sources of perceived control. However, research on misattribution processes has shown that people often fail to correct for antecedent causes of mental states when judging the magnitude of a subsequent cause (see Zillman, 1996, for a review). Thus, actors may be generally inadequate at distinguishing the experiential state corresponding with choice-derived control from that corresponding with task-derived control. Self-assessments of performance may therefore be augmented, with actors feeling that they are more in control of the task (i.e., are performing better) after enjoying some form of choice, no matter how incidental. The enhancement would be due to failure to fully subtract out the increment of perceived control produced by choice when spontaneously judging how well one is doing at the task.

All of this suggests an elevated sense of competence that is directly attributable to the perceived control of choice and its effect on the experience of a task. This augmentation hypothesis generates the prediction that incidental choice will lead to greater task confidence, even when actual performance and any anticipatory cuing effects are controlled.

Past research on choice and posttask confidence for activities requiring effort and ability is remarkably scarce. Somewhat relevant is a study by Jellison and Harvey (1973) in which college students were asked to predict which of two football teams would win a match. By manipulating the information given to participants about the teams, the researchers were able to systematically vary perceived choice in deciding the winner. Pertinent here is their finding that perceived choice correlated positively with participants' subsequent perceived competence for predicting the outcomes of football games. This is consistent with our augmentation hypothesis, although the confounding of task difficulty with degree of choice and the crudeness of the performance criterion precludes identifying the specific cause of the effect.

The following two studies were designed as more refined tests of augmentation. In operationalizing choice, we tried to separate the act of choosing from recognition that choice would have consequences for the shape of the task. Perceived control has most often been identified with effective choice (i.e., choice that makes a difference), suggesting that any enhancement of perceived performance is contingent on the chooser perceiving that the choices have an impact on the task. However, control also may be derived from choice for its own

sake, irrespective of impact. If so, then the very act of choosing may enhance the subsequent experience of competence. To determine whether perceived impact is critical to the augmentation effect, a provision was made to compare the effect of choice that is recognized as consequential (albeit only superficially) for the task with the effect of choice that is recognized as inconsequential.

To focus on the proposed augmentation effect of choice on perceived performance, we sought to minimize any indirect, motivational effects. An experimental task was created that most participants would find interesting and intrinsically motivating (even without the embellishment of choice) in the hope that the effect of any motivational increment would be subtle at best. Piloting revealed that reading a lively short story was suitably engaging for the student population from which participants would be recruited. Evidence for an augmentation effect would be reflected in enhanced post-task confidence due to choice. Specifically, we predicted that participants would think they understood the story better and performed better on a comprehension test if they chose the names used in the story.

STUDY 1

Method

Participants. Participants were 54 female students at the University of Wales, Cardiff, who participated for either course credit or cash payment (£4). Their modal age was 20. All participants were native English speakers.

Procedure. Participants were individually tested by a female experimenter. A computed-based task was used. The consent form described the study as examining "subjective reactions to short stories." After being oriented to the computer screen, participants worked through the procedure alone. On-screen instructions stated that a short story was about to be presented in the form of a continuous line of text that "crawled" across the screen from right to left. Controlled presentation was used to force equivalence in reading speed across participants. The participants' only task was to silently "read and understand the story."

Three conditions were run: effective-choice, ineffective-choice, and no-choice. In the two choice conditions, the following instructions appeared:

> Before we begin the presentation, we would like to get your reaction to some names. For each set of six names that will be presented, do the following: Considering both the appearance and sound of each of the names in the set, decide which one of the six you personally like the best. There are no "right" or "wrong" responses here; we just want to know which of the names YOU like the best.

The instructions were designed to offer choice without any implication that the choice had bearing on the story that would be read. Questioning during debriefing confirmed the intended effect: The instructions did not lead participants to expect that their choices would be used in the story. Rather, participants assumed that the researchers were simply surveying preferences to determine what sorts of names people liked.

Thirteen sets of names were presented in series to those in the choice conditions. Thus, 13 choices were made. The options were unusual names; any resemblance to names that the participants may have been familiar with was avoided. Each set of six options was created by transposing one pair of consonants within a root name (e.g., Ojebeta, Obejeta, Otebeja, Ojeteba, Otejeba, Obeteja). The options were made highly similar to promote subtle preferences, which have been shown to produce the highest degree of perceived choice (Harvey & Harris, 1975; Harvey & Johnson, 1973; Jellison & Harvey, 1973). More pronounced differences in the attractiveness of options make the choice a foregone conclusion, reducing subjective "decision freedom" (Steiner, 1970).

After making their choices, participants in the effective-choice condition learned that the 13 names they had chosen would be used in the story. In contrast, participants in the ineffective-choice condition learned that the names to be used would be randomly selected from the options they had viewed. The entire choice phase was omitted for participants in the no-choice condition, who were told nothing about how the names in the story were selected. Participants in all three conditions were then asked to rate their liking for the names that would actually be used in the story. These names were presented one at a time. Liking ratings were made on a scale ranging from 1 (*not at all*) to 10 (*very much*). For effective-choice participants, the names were the ones they had selected. For ineffective-choice participants, the names were the selections of a yoked effective-choice participant, with the exception that when an ineffective-choice participant made the same selection as the yoked counterpart, an alternate option was randomly assigned. This ensured that ineffective-choice participants did not have any of their selections used in the story due to chance overlap. No-choice participants also were assigned the selections of a yoked effective-choice participant. The name ratings served two purposes. First, it ensured that all participants—including those in the no-choice condition—had prior exposure to the names that appeared in the story they read. This minimized familiarity differences that could affect perceived and/or actual performance. Second, the ratings allowed average liking for the names to be compared across conditions. If differences across options were

minimal (as intended), then very subtle preferences should result such that effective-choice participants do not like their chosen names much more than do yoked ineffective-choice participants.

All participants then read the story. The text appeared as black, 18-point, Helvetica characters against an off-white horizontal bar. Crawl speed was 10 centimeters per second. The story was a self-standing excerpt from Buchi Emecheta's (1979) *The Slave Girl*. Set in Nigeria, it poignantly described a young tribesman's betrayal of his 7-year-old sister. The excerpt was selected for its simple, action-focused style and general interest value. Piloting confirmed that most students found the story engaging. It was approximately 30 minutes in duration.

Immediately following presentation of the story, participants provided an on-screen rating of how interesting they found the story on a 10-point scale ranging from 1 (*not at all*) to 10 (*very*). This provided a simple measure of intrinsic motivation for the reading task. A second question asked participants to rate how well they felt they understood the story on a 10-point scale ranging from 1 (*not at all*) to 10 (*completely*). This rating provided an initial measure of perceived competence. The ratings were followed by a 54-question, 4-option, multiple-choice test of moderate difficulty. All questions addressed the actions or qualities of a character or place, the name of which was selected in the effective-choice condition and assigned in the other two conditions. Questions were serially presented and participants were required to choose what they felt was the correct response for each, regardless of how unsure they were. The test provided a measure of actual competence. In addition, the time spent by the participant on each question was recorded by the computer. Participants were unaware of being timed.

After completing the test, participants provided a second, more refined measure of perceived competence—an estimate of the number of questions that they had correctly answered. Finally, participants were probed for their understanding of the study and debriefed. The entire session lasted approximately 45 minutes.

Results

One participant was eliminated because of excessive difficulty in following the scrolling text. Means and standard deviations for the variables analyzed below are shown in Table 1; the total-sample correlation matrix (similar across conditions) is shown in Table 2. Notably, rated understanding of the story, estimated test score, and actual test score were all moderately intercorrelated. This confirms that participants were making reasoned judgments: Their perceptions of their performance appeared to be sensitive to how well they actually understood the story. Thus, any effect of choice on these perceptions cannot be dismissed as a byproduct of uninformed or careless responding.

Perceived performance. A one-way ANCOVA was conducted to examine differences across the three conditions in estimated test score, controlling for actual test score.[1] Significant effects were found for both condition, $F(2, 49) = 4.23$, $p = .02$, and actual test score (positive association), $F(1, 49) = 37.03$, $p < .0001$. A planned comparison of the effective-choice condition with the no-choice condition was conducted. As predicted, effective-choice participants made higher estimates on average than did no-choice participants, independent of any difference in actual score, $F(1, 49) = 4.54$, $p = .04$. To test the possibility that choice per se was responsible for this effect, the ineffective-choice condition was compared against the no-choice condition in a parallel test. The difference was not significant, $F(1, 49) = 0.38$, $p = .54$, indicating that the score estimates of ineffective-choice participants were not boosted like those of effective-choice participants.

Was the effect of choice on perceived competence also expressed prior to the comprehension test in participants' ratings of how well the story was understood? A second ANCOVA was conducted to answer this question, again using actual test score as the covariate. As before, significant effects were found for condition, $F(2, 49) = 8.82$, $p = .0005$, and for actual test score (positive association), $F(1, 49) = 24.56$, $p < .0001$. Planned comparisons showed that independent of how they later fared on the comprehension test, participants in the effective-choice condition felt that they understood the story better than did participants in the no-choice condition, $F(1, 49) = 10.30$, $p = .002$, whereas participants in the ineffective-choice condition did not, $F(1, 49) = .52$, $p = .48$.

Actual performance. A one-way ANOVA was conducted to examine test score differences across the three conditions. There was no significant effect for condition, $F(2, 50) = 1.34$, $p = .27$, suggesting that choice did not enhance actual performance. However, a potential confound here is the effect of choice on time spent completing the test items. Choice may have motivated participants to work through the test faster and less carefully. Such a tendency might have offset any beneficial effect of choice on comprehension. Because the pattern of differences across conditions may differ for questions answered correctly versus incorrectly, the average time (per item) was computed separately for both types of questions. These values were submitted to a repeated-measures ANOVA, with condition as the between-participants factor and question type (correct vs. incorrect) as the within-participants factor. A large effect was

TABLE 1: Means on Variables Analyzed in Study 1 for Effective-Choice (n = 18), Ineffective-Choice (n = 17), and No-Choice (n = 18) Groups

Variable	*Condition*	M	SD	*Adjusted* M[a]
Estimated test score	Effective choice	28.89	9.38	28.71
	Ineffective choice	23.88	10.26	22.30
	No choice	22.11	7.14	23.79
Rated understanding	Effective choice	6.89	1.18	6.87
	Ineffective choice	5.65	1.32	5.45
	No choice	5.50	1.38	5.71
Actual test score	Effective choice	31.44	6.72	—
	Ineffective choice	33.00	6.63	—
	No choice	29.39	6.28	—
Time spent on questions answered correctly[b]	Effective choice	7.83	2.20	—
	Ineffective choice	8.63	2.66	—
	No choice	8.23	1.68	—
Time spent on questions answered incorrectly	Effective choice	9.75	2.74	—
	Ineffective choice	10.43	2.70	—
	No choice	9.90	2.09	—
Rated interest	Effective choice	6.50	1.42	—
	Ineffective choice	6.47	1.28	—
	No choice	6.22	1.77	—
Liking of names	Effective choice	5.13	0.98	—
	Ineffective choice	4.91	1.29	—
	No choice	4.38	1.30	—

NOTE: Scale ranges are 0 to 54 for estimated and actual test score and 1 to 10 for understanding, interest, and liking ratings.
a. Means adjusted for actual performance.
b. Average time per question, in seconds.

found for question type, $F(1, 50) = 134.77$, $p < .0001$, revealing that participants spent more time on questions that they answered incorrectly than on questions that they answered correctly. Assuming that participants were less certain about questions answered incorrectly, this difference is hardly surprising. Most important, however, there was no effect for condition, $F(2, 50) = .46$, $p = .63$, or for the Condition × Question Type interaction, $F(2, 50) = .23$, $p = .79$. That the three conditions did not differ in how much time was spent on the test suggests that the absence of enhanced performance in the effective-choice condition cannot be due to speed.

Interest. Were effective-choice participants more intrinsically motivated during the reading task than participants in the other conditions? To test this possibility, ratings of how interesting participants found the story were submitted to a one-way (condition) ANOVA. There was no effect for condition, $F(2, 50) = .18$, $p = .83$, in line with the expectation that any motivational increment produced by minor choice would be negligible for a naturally interesting task.

Liking for names. Differences across conditions in liking for the chosen / assigned names also were examined. The 13 liking ratings were averaged for each participant, and this value was submitted to a one-way (condition) ANOVA. The effect for condition was not significant, $F(2, 50) = 1.85$, $p = .17$.

Discussion

The results are consistent with the hypothesis that choice enhances perceptions of competence independent of actual performance. Even choices as trivial as deciding among highly similar and unusual names led to higher estimates of comprehension and test performance. Notably, there was no evidence that choice enhanced actual performance, nor did choice lead to higher interest in the story. These null findings are consistent with the claim that the motivating power of choice, and its impact on performance, may be too weak to discern in tasks that are already highly interesting and engaging.

Participants who chose names not used in the story did not exhibit heightened perceptions of competence relative to those who made no choices. Only participants whose choices affected the story expressed increased confidence in understanding and test score. Perceived contingency or effect therefore appears to be critical to increased subjective control and subsequent augmentation of self-perceived performance.

The choices offered in the present study were deliberately impoverished of personal meaning. The story was set in an exotic land so that the unfamiliar names did not seem conspicuous or contrived. A “Hibotag” from Birmingham might have strained credibility, whereas a Hibotag from Nigeria did not. The minor differences in choice options presumably minimized differences in the

TABLE 2: Total-Sample Correlation Matrix for Variables Analyzed in Study 1

Variable	*1*	*2*	*3*	*4*	*5*	*6*	*7*
1. Rated understanding	—	.48**	.52**	–.14	–.08	.56**	.14
2. Estimated test score		—	.63**	–.42**	–.31*	.47**	.25
3. Actual test score			—	–.31*	–.23	.54**	.14
4. Time spent on questions answered Correctly				—	.90**	–.05	.06
5. Time spent on questions answered incorrectly					—	.02	.05
6. Rated interest						—	–.07
7. Liking							—

*$p < .05$. **$p < .005$.

perceived attractiveness of those options. Confirming the success of this deliberate minimization, we found that effective-choice participants did not like the names that they chose any more than the other groups liked the names that they were assigned. Given that ineffective-choice participants were not assigned any of the names they selected, the absence of a liking effect is striking.

Taken altogether, our findings are consistent with the claim that choice exerts an effect on confidence by augmenting perceived control during the task. However, the results could be as easily explained as a simple performance cue effect. Effective-choice participants may have been cued to hold raised expectations for task performance after choosing names that they learned would be used in the story. The same cuing may have also boosted participants' later confidence in how well they understood the story and fared on the comprehension test, given the absence of any clear feedback. These two competing interpretations—augmentation and predictive cuing—suggest distinct processes. The augmentation hypothesis contends that the critical locus of the effect is the reading of the story. That is, choice is held to enhance confidence during the reading task through an increase in perceived control that becomes misidentified as competence at the task (i.e., reading comprehension). In contrast, the performance cue hypothesis contends that confidence is raised even before the story is read. Here, the experience of effective choice is itself enough to immediately raise expectations due to the learned association of choice with performance advantage.

To decide between the two interpretations, we conducted a second study that examined whether confidence is raised after choice but before reading. Moreover, we sought to demonstrate that choice increases postreading confidence independent of any effect it may have on prereading confidence. Such a result would imply that the enhancement effect found in the first study was due to judgmental processes that occur after reading begins. This temporal sequence is consistent with the augmentation hypothesis but conflicts with the performance cue alternative.

STUDY 2

Method

Participants. Participants were 48 female students at the University of Toronto who participated for course credit. The modal age was 19. All participants were native English speakers.

Procedure. The design and procedure were identical to Study 1, with the following modifications. First, immediately after participants learned that chosen / assigned names would be used in the story and indicated their liking for these names, they rated on a 10-point scale ranging from 1 (*not at all*) to 10 (*completely*) how well they expected to understand the story that they were about to read. To facilitate responding to this question, participants were told that the story followed a linear structure, used simple language, and was presented at a brisk rate that was not overly difficult for most readers. The rating provided a prereading but postchoice measure of task confidence that mirrored the wording and form of the postreading comprehension measure. (A prereading test score estimate parallel in form to the posttest estimate, although desirable, would have seemed odd to participants because they would be predicting their actual scores without knowing enough about the test.) Second, participants rated on a 10-point scale ranging from 1 (*none*) to 10 (*a lot*) how much control they felt over the form of the task. This served as a manipulation check to confirm the assumption made in the first study that effective-choice participants enjoyed a higher degree of perceived control than did those in the other conditions.

Results

Four participants were eliminated because of excessive difficulty in following the scrolling text. An additional participant was eliminated due to corrupted data. Means and standard deviations for the variables analyzed below are shown in Table 3; the total-sample correlation matrix (similar across conditions) is shown in Table 4. Again, the postreading understanding rating, estimated test score, and actual test score were all moderately intercorrelated, reflecting the rational dependence of self-judged performance on actual performance. Consistent with this interpretation, the prereading understanding rating, made before the participant had any

TABLE 3: Means on Variables Analyzed in Study 2 for Effective-Choice (n = 14), Ineffective-Choice (n = 14), and No-Choice (n = 15) Groups

Variable	*Condition*	M	SD	*Adjusted* M[a]
Estimated test score	Effective choice	32.36	9.97	30.07
	Ineffective choice	20.00	10.85	22.02
	No choice	22.47	11.52	22.72
Rated understanding	Effective choice	7.71	1.86	7.28
	Ineffective choice	5.07	1.86	5.46
	No choice	5.53	1.60	5.58
Actual test score	Effective choice	29.64	7.71	—
	Ineffective choice	24.50	7.39	—
	No choice	26.60	8.07	—
Time spent on questions answered correctly[b]	Effective choice	8.50	2.40	—
	Ineffective choice	8.43	1.45	—
	No choice	9.61	2.29	—
Time spent on questions answered incorrectly	Effective choice	10.53	2.55	—
	Ineffective choice	10.65	2.14	—
	No choice	10.76	2.93	—
Rated interest	Effective choice	7.50	1.65	—
	Ineffective choice	6.43	1.91	—
	No choice	6.47	1.99	—
Liking of names	Effective choice	5.24	0.96	—
	Ineffective choice	5.50	1.51	—
	No choice	4.76	1.27	—
Prereading rated understanding	Effective choice	8.43	0.65	—
	Ineffective choice	7.86	1.35	—
	No choice	7.93	1.67	—
Perceived control	Effective choice	4.79	1.58	—
	Ineffective choice	3.07	1.59	—
	No choice	2.60	1.99	—

NOTE: Scale ranges are 0 to 54 for estimated and actual test score and 1 to 10 for all other ratings.
a. Means adjusted for actual performance.
b. Average time per question, in seconds.

experience with the task, was not correlated with actual performance.

Perceived performance. To first replicate the findings of Study 1, an ANCOVA was conducted to examine differences across conditions in estimated test score, controlling for actual test score. Significant effects were found for both condition, $F(2, 39) = 3.41$, $p = .04$, and actual test score (positive association), $F(1, 39) = 21.81$, $p < .0001$. As in the previous study, effective-choice participants gave higher estimates than did no-choice participants, independent of any difference in their actual performance, $F(1, 39) = 4.93$, $p = .03$, whereas ineffective-choice participants did not, $F < 1$.

Parallel ANCOVA results were found for postreading rated understanding, controlling for actual test score. Significant effects were found for both condition, $F(2, 39) = 8.28$, $p = .001$, and actual test score (positive), $F(1, 39) = 36.91$, $p < .0001$. Again, participants in the effective-choice condition were more confident about their understanding of the story than were participants in the no-choice condition, $F(1, 39) = 12.25$, $p = .001$, whereas participants in the ineffective-choice condition were not, $F < 1$.

Actual performance. As in the previous study, the three conditions did not significantly differ in actual test score, $F(2, 40) = 1.56$, $p = .22$. Furthermore, a repeated-measures ANOVA examining time spent on test questions again revealed only a large effect for question type, $F(1, 40) = 42.76$, $p < .0001$, with participants spending more time on questions that they answered incorrectly than on questions they answered correctly.

Interest and liking for names. Differences in how interesting participants found the story were examined as before. Again, the effect for condition was negligible, $F(2, 40) = 1.51$, $p = .23$. Differential liking of the chosen / assigned names across conditions was examined as before. Again, no significant differences emerged, $F(2, 40) = 1.27$, $p = .29$.

Perceived control. An ANOVA was conducted on the perceived control rating to test the assumption that effective-choice participants enjoyed a heightened level of perceived control before reading the story. The effect for condition was significant, $F(2, 40) = 6.26$, $p = .004$. As expected, effective-choice participants felt more control over the form of the story that they were about to read

TABLE 4: Total-Sample Correlation Matrix for Variables Analyzed in Study 2

Variable	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Rated understanding	—	.62**	.70**	–.27	.12	.55**	.09	.27	.31*
2. Estimated test score		—	.63**	–.37*	–.09	.40**	–.05	.15	.20
3. Actual test score			—	–.50**	–.16	.62**	.15	.19	.11
4. Time spent on questions answered correctly				—	.70**	–.17	–.09	–.01	–.02
5. Time spent on questions answered incorrectly					—	.19	.03	–.02	.06
6. Rated interest						—	.16	–.16	.07
7. Liking							—	–.13	.16
8. Prereading rated understanding								—	.16
9. Perceived control									—

*$p < .05$. **$p < .005$.

than did no-choice participants, $F(2, 40) = 11.42$, $p = .002$, whereas ineffective-choice participants did not, $F < 1$.

Controlling for prereading confidence. The main purpose of the study was to confirm that choice raises postreading confidence independent of any effect it has on anticipatory (prereading) confidence. This result would be inconsistent with the operation of choice as a simple performance cue. The significance of choice as a predictor of success should be as apparent before as after the story. Moreover, insofar as predictive cuing occurs, it may actually have a greater effect on anticipatory confidence because of the lack of any competing performance-relevant information (which comes with reading the story).

To address this issue, differences in prereading confidence were first examined using the expected understanding rating. An ANOVA revealed no significant effect for condition, $F < 1$, suggesting that effective-choice participants did not feel more confident than did participants in the other conditions about how well they would understand the story they were about to read. This finding clearly challenges the performance cue interpretation. Even so, to conduct a strict test of postreading confidence independent of prereading confidence, the ANCOVAs on estimated test score and rated understanding were repeated, this time entering expected understanding as a second covariate alongside actual test score. In both cases, the pattern of effects remained exactly the same. Namely, effective-choice participants gave higher estimates than did no-choice participants, independent of any difference in their actual performance and prereading confidence, $F(1, 38) = 4.84$, $p = .03$, whereas ineffective-choice participants did not, $F < 1$. Similarly, effective-choice participants were more confident about their understanding of the story than were no-choice participants, independent of the two covariates, $F(1, 38) = 11.16$, $p = .002$, whereas ineffective-choice participants were not, $F < 1$. These results confirm that the enhanced posttask confidence of effective-choice participants found in both studies was in no way related to confidence prior to the reading task. This supports the augmentation rather than performance cue interpretation of our findings.

Discussion

Study 2 provides a successful replication of the first study: Effective but not ineffective choice enhanced posttask perceptions of performance, leaving actual performance, interest in the task, test speed, and liking of the names unaffected. The second study also revealed that effective choice produces a significant increase in perceived control, an assumption that is critical to the augmentation hypothesis. Finally, raised expectations for task performance were not found prior to reading, and controlling for pretask expectations did not alter the pattern of findings for posttask perceptions of performance. Thus, choice appears to affect confidence during the reading of the story, not before. This locus of effect is incompatible with the performance cue hypothesis.

Alternatively, and contrary to the augmentation hypothesis, it is possible that the effect occurs after the reading of the story, during the posttask judgments. Effective-choice participants may have felt no more confident than the others while they read the story but became surer of their performance only later when asked to rate their understanding and estimate their test scores. The problem with this possibility is that it suggests a delayed performance cue effect akin to the one already discounted. The delay also raises the question of why choice should be subjectively associated with success after a task but not before. The consequential nature of the choices was made clear to effective-choice participants prior to reading, when they learned that the names they chose would be used in the story. Moreover, they exhibited a significant increase in perceived control prior to reading, confirming their accurate processing of this information. All of this suggests that the increased confidence of effective-choice participants emerged during the reading task itself, consistent with the hypothesized augmentation process. Future work should aim at providing direct evidence for this on-line

increase in confidence, perhaps through tracking its gradient over the course of the task.

GENERAL DISCUSSION

The two studies provide initial evidence that choice, as a source of perceived control over a task, boosts confidence beyond any effect it may have on actual performance. This finding complements past work demonstrating that choice can induce anticipatory confidence on chance-determined (Langer, 1975) and ability-determined tasks (Henry, 1994). Apparently, effective choice can also enhance the retrospective assessment of performance. The present effect, however, appears to involve a distinct process, for anticipatory confidence was not heightened as in earlier studies. The fact that choice did not increase interest in the task suggests that choice had no effect on intrinsic motivation and may have had little effect on general motivation. The latter conclusion is consistent with the absence of effects for test speed and actual performance.

The absence of both motivational effects and anticipatory enhancement in confidence cannot be easily accommodated by previous theoretical interpretations but corresponds well with the proposed augmentation process. The failure of choice to heighten motivation can be attributed to the reading task and the trivial and impoverished nature of the choices. It is likely that any motivational increment afforded by those choices produced a negligible proportional increase in the desire to complete a task that was already fairly engaging. This dovetails with the lack of effect on actual score, given that performance differences found in the past have been shown to be contingent on motivational change (Monty & Perlmuter, 1987; Perlmuter & Monty, 1982).

A remaining question in relation to past findings is why choice did not operate as a predictive cue here, raising anticipatory confidence. The form of choice manipulation may be responsible. As mentioned, the choices that participants made were relatively minor and appeared to have no relevance for performance outcome, in contrast to manipulations used in past research in which anticipatory effects were found. Henry (1994), for example, led participants to believe that they were blindly choosing a set of almanac questions to answer. Langer (1975) allowed participants choice in a lottery ticket. In both cases, participants presumably felt that the global choice that they were making held implications for the outcome (although the choice in fact had no impact on outcome). Had similar performance-relevant choices been offered here, stronger cuing may have resulted.

In conceiving of choice as perceived control, our findings suggest that the perceived effect of choice on the form of a task is critical to this functional equation. If the act of selecting among options itself increases perceived control, then the increment is insufficient in magnitude to affect subsequent judgments of performance through augmentation. Choice without perceived consequences appears to have little bearing on confidence.

An obvious limitation of the present research is the exclusive use of women as participants. This limitation was tolerated in this initial investigation of the augmentation hypothesis because of our desire to maintain a simple design. Men may differ in their response to incidental choice. Even so, it is doubtful that augmentation is categorically absent in men. In fact, at least one study suggests that men may be more prone than women to heightened confidence following task choice (Henry, 1994). This disparity may be due to the tendency for men to have greater desire for control (Burger & Cooper, 1979), a trait positively associated with increased confidence following choice (Burger, 1986). Research examining potential gender differences in the exact form of the augmentation effect is needed.

Actual Performance Revisited

The finding that choice had no immediate effect on actual test performance suggests that a boost in perceived competence does little to enhance performance. However, this conclusion is shortsighted for two reasons. First, the perceived control afforded by name choice might have produced performance benefits invisible within the present paradigm. Glass and Singer (1972), for example, found that perceived control over unpredictable noise led to more persistence on subsequent unrelated performance tasks. Similarly, Weiss and Sherman (1973) found that people higher in dispositional perceived control were more likely to increase effort after task failure, rising to the challenge of initial defeat. Finally, choice has been shown to reduce stress during aversive stimulation (Corah & Boffa, 1970; Mills & Krantz, 1979), holding promise for enhanced performance on tasks with unpleasant aspects. None of these possibilities were examined here.

Second, the inherent limitations of the one-shot experimental study must be recognized. Chronically enhanced perceptions of performance are likely to have profound consequences for the development of skills and the expression of ability over time. In explaining how confidence is conducive to the emergence of competence, Markus et al. (1990) have argued that "what may appear to an observer as an unfounded optimistic belief that one is competent can actually create competence by selectively directing attention, efforts, and energies toward the desired action, and away from inconsistent or contradictory thoughts, feelings, and actions" (p. 213). Projecting this facilitation through time, confidence in one's own ability to perform a task may pro-

mote the development of the very skills required for mastery of that task. If so, then those whose lives are replete with choice may enjoy not only increased freedom, self-direction, and self-expression, but also an appreciable advantage in developing the competencies required to meet their goals. Hence, choice-induced confidence may hold enduring benefits not easily discerned in the laboratory.

Future research should aim at providing a broader examination of task performance, examining features other than gross test scores, and tracking learning and skill development over extended periods of time. Benefits attributable to augmentation would invite application in educational settings (Deci, Vallerand, Pelletier, & Ryan, 1991; Wasserman, 1991). For example, students hampered by excessive doubt about their ability to learn may profit from increased confidence through the provision of choice. Elevated confidence also could guard against motivational vulnerabilities stemming from fear of failure, promoting instead decisions and commitments that facilitate learning. Evidence from studies conducted in organizations (e.g., Deci, Connell, & Ryan, 1989) suggests that similar benefits may be realized in work settings, especially where opportunities for control are limited. More broadly, choice, however superficial, may reveal itself to be a useful intervention wherever the development of ability is challenged.

NOTE

1. For all ANCOVAs reported throughout, preliminary analyses confirmed homogeneity of covariance across conditions. Also, in recognition of the interpretive hazards inherent to residualized results (see Lees & Neufeld, 1994), supplementary ANOVAs (covariates eliminated) were conducted alongside the ANCOVAs. In every case, ANOVA and ANCOVA results converged, suggesting that effects found through ANCOVA were not dependent on residualization.

REFERENCES

Bardwell, R. (1984). The development and motivational function of expectations. *American Educational Research Journal, 21*, 461-472.

Burger, J. M. (1986). Desire for control and the illusion of control: The effects of familiarity and sequence of outcomes. *Journal of Research in Personality, 20*, 66-76.

Burger, J. M. (1987). Increased performance with increased personal control: A self-presentational interpretation. *Journal of Experimental Social Psychology, 23*, 350-360.

Burger, J. M. (1989). Negative reactions to increases in perceived personal control. *Journal of Personality and Social Psychology, 56*, 246-256.

Burger, J. M., & Cooper, H. M. (1979). The desirability of control. *Motivation and Emotion, 3*, 381-393.

Corah, N. L., & Boffa, J. (1970). Perceived control, self-observation, and response to aversive stimulation. *Journal of Personality and Social Psychology, 16*, 1-4.

deCharms, R. (1983). *Personal causation: The internal affective determinants of behavior.* Hillsdale, NJ: Lawrence Erlbaum. (Original work published 1968)

Deci, E. L., Connell, J. P., & Ryan, R. M. (1989). Self-determination in a work organization. *Journal of Applied Psychology, 4*, 580-590.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior.* New York: Plenum.

Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist, 26*, 325-346.

Emecheta, B. (1979). *The slave girl*. London: Collins/Fontana Books.

Estes, W. K. (1976). The cognitive side of probability learning. *Psychological Review, 83*, 37-64.

Glass, D. C., & Singer, J. E. (1972). Behavioral aftereffects of unpredictable and uncontrollable aversive events. *American Scientist, 60*, 457-465.

Harvey, J. H., & Harris, B. (1975). Determinants of perceived choice and the relationship between perceived choice and expectancy about feelings of internal control. *Journal of Personality and Social Psychology, 31*, 101-106.

Harvey, J. H., & Johnson, S. (1973). Determinants of the perception of choice. *Journal of Experimental Social Psychology, 9*, 164-179.

Henry, R. A. (1994). The effects of choice and incentives on the overestimation of future performance. *Organizational Behavior and Human Decision Processes, 57*, 210-225.

Henry, R. A., & Sniezek, J. A. (1993). Situational factors affecting judgments of future performance. *Organizational Behavior and Human Decision Processes, 54*, 104-132.

Jellison, J. M., & Harvey, J. H. (1973). Determinants of perceived choice and the relationship between perceived choice and perceived competence. *Journal of Personality and Social Psychology, 28*, 376-382.

Kukde, M. P., & Neufeld, R.W.J. (1994). Facial electromyographic measures distinguish covert coping from stress response to stimulus threat. *Personality and Individual Differences, 16*, 211-228.

Langer, E. J. (1975). The illusion of control. *Journal of Personality and Social Psychology, 32*, 311-328.

Lees, M. C., & Neufeld, R.W.J. (1994). Matching the limits of clinical inference to the limits of quantitative methods: A formal appeal to practice what we consistently preach. *Canadian Psychology, 35*, 268-282.

Markus, H., Cross, S., & Wurf, E. (1990). The role of the self-system in competence. In R. J. Sternberg & J. Kooligian, Jr. (Eds.), *Competence considered* (pp. 205-225). New Haven, CT: Yale University Press.

Mikulincer, M. (1988). Freedom of choice, control, and learned helplessness. *Journal of Social and Clinical Psychology, 7*, 203-213.

Mills, R. T., & Krantz, D. S. (1979). Information, choice, and reactions to stress: A field experiment in the blood bank with laboratory analogue. *Journal of Personality and Social Psychology, 37*, 608-620.

Monty, R. A., & Perlmuter, L. C. (1975). Persistence of the effects of choice on paired-associate learning. *Memory & Cognition, 3*, 183-187.

Monty, R. A., & Perlmuter, L. C. (1987). Choice, control, and motivation in the young and the aged. In M. L. Maehr & D. L. Kleiber (Eds.), *Advances in motivation and achievement: Vol. 5. Enhancing motivation* (pp. 99-122). Greenwich, CT: JAI.

Monty, R. A., Rosenberger, M. A., & Perlmuter, L. C. (1973). Amount and locus of choice as sources of motivation in paired-associate learning. *Journal of Experimental Psychology, 97*, 16-21.

Morrison, M. S., Neufeld, R.W.J., & Lefebvre, L. A. (1988). The economy of probabilistic stress: Interplay of controlling activity and threat reduction. *British Journal of Mathematical and Statistical Psychology, 41*, 155-177.

Paterson, R. J., & Neufeld, R.W.J. (1995). What are my options? Influences of choice availability on stress and the perception of control. *Journal of Research in Personality, 29*, 145-167.

Perlmuter, L. C., & Monty, R. A. (1973). Effect of choice of stimulus on paired-associate learning. *Journal of Experimental Psychology, 99*, 120-123.

Perlmuter, L. C., & Monty, R. A. (1977). The importance of perceived control: Fact or fantasy? *American Scientist, 65*, 759-765.

Perlmuter, L. C., & Monty, R. A. (1982). Contextual effects on learning and memory. *Bulletin of the Psychonomic Society, 20*, 290-292.

Perlmuter, L. C., Monty, R. A., & Kimble, G. A. (1971). Effect of choice on paired-associate learning. *Journal of Experimental Psychology, 91*, 47-53.

Perlmuter, L. C., Scharff, K., Karsh, R., & Monty, R. A. (1980). Perceived control: A generalized state of motivation. *Motivation and Emotion, 4*, 35-45.

Rodin, J., Rennert, K., & Solomon, S. K. (1980). Intrinsic motivation for control: Fact or fiction. In A. Baum & J. E. Singer (Eds.), *Advances in environment psychology: Vol. 2. Applications of personal control* (pp. 131-148). Hillsdale, NJ: Lawrence Erlbaum.

Steiner, I. (1970). Perceived freedom. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 5, pp. 197-248). New York: Academic Press.

Swann, W. B., Jr., & Pittman, T. S. (1977). Initiating play activity of children: The moderating influence of verbal cues on intrinsic motivation. *Child Development, 48*, 1128-1132.

Wasserman, S. (1991, summer). Louis E. Raths: Theories of empowerment. *Childhood Education*, pp. 235-239.

Weiss, H., & Sherman, J. (1973). Internal-external control as a predictor of task effort and satisfaction subsequent to failure. *Journal of Applied Psychology, 57*(2), 132-136.

Wiersma, U. J. (1992). The effects of extrinsic rewards in intrinsic motivation: A meta-analysis. *Journal of Occupational and Organizational Psychology, 65*, 101-114.

Zillman, D. (1996). Sequential dependencies in emotional experience and behavior. In R. D. Kavanaugh, B. Zimmerman, & S. Fein (Eds.), *Emotion: Interdisciplinary perspectives* (pp. 243-272). Hillsdale, NJ: Lawrence Erlbaum.

Zuckerman, M., Porac, J., Lathin, D., Smith, R., & Deci, E. L. (1978). On the importance of self-determination for intrinsically-motivated behavior. *Personality and Social Psychology Bulletin*, *4*, 443-446.

Received September 9, 1997
Revision accepted August 12, 1998