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## Causal Attribution Preferences and Prospective Self-Assessment: The Unknowns of the Middle Eastern Learner

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### Abstract

In the present field experiment, we examined the effects of a self-assessment exercise conducted in the middle of the semester on metacognitive awareness (i.e., the accuracy of self-assessment and its subjective confidence) and final test performance of college students of Middle Eastern descent. Effects were measured in the classroom against a business-as-usual control condition. It was hypothesized that if the exercise focuses students' attention on internal causes (e.g., effort) in response to specific task demands, metacognitive awareness, metacognitive control, and, ultimately, final test performance would be enhanced. In poor performers, the exercise indeed improved the accuracy of self-assessment (as measured by grade estimates) and final performance. There was no evidence of the illusion of knowing phenomenon (i.e., the unrealistic belief that one knows or is able to perform a given task) among poor-performing students as their confidence in estimates remained low. Furthermore, the exercise did not change students' causal attribution preferences, thereby suggesting that other dynamics are responsible for the effects of the self-assessment exercise.

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### Introduction

The quality of learners' performance on an upcoming task, such as a test or assignment, relies on the extent to which the knowledge and skills that they possess overlap with the particular demands of the task. Of course, desirable performance begins well before the actual task is executed. It derives from the learners' ability to accurately estimate their performance on the upcoming task (metacognitive awareness) as well as their commitment to engage in corrective actions (metacognitive control) if the degree of discrepancy between desired and predicted performance is significant (Avhustiuk et al., 2018). Consider, for instance, students who are preparing for a test. At the very least, estimation of their likely performance will affect the selection of learning activities and strategies, as well as the effort exerted at study and at test. If estimation leads to the faulty conclusion that they are sufficiently prepared, or even over-prepared, corrective actions will not be exercised. It follows that the accuracy of estimation is a key precursor of successful test performance. Yet, estimation is a complex process executed under a certain degree of uncertainty regarding the precise demands of the test and the degree to which test-appropriate knowledge and skills are possessed (Dunning et al., 2004; Zell & Krizan, 2014). It relies on prospection, which is learners' ability to "pre-experience the future" by simulating it in their minds (Gilbert & Wilson, 2007, 1352). As such, prospection refers to learners' orientation towards the future

(including prediction and anticipation) through which information stored in long-term memory or accessible in the current environment is used to imagine, simulate and predict future occurrences (Schacter et al., 2007). In studies of pre-experiences of the future, the terms prediction, expectation, and estimation can be used interchangeably to refer to the representation of a forthcoming event (e.g., taking a test), whereas anticipation is used to describe the impact of a prediction on cognition and behavior (e.g., ensuing thoughts, feelings, and actions; Butz et al., 2003). It follows that whereas prospection may be critical to both metacognitive awareness and control, the adequacy of prediction can be conceptualized as primarily concerning the ability of learners to exercise metacognitive awareness, and the adequacy of anticipation as primarily entailing the learners' ability to exercise metacognitive control (Bubic et al., 2010).

Until recently, the main culprit of inaccuracies of estimation was said to be the illusion of knowing phenomenon, which represents the learners' beliefs that they have attained knowledge and skills or, more generally, possess the competence to execute a given task, even though objective assessment suggests otherwise (Castel et al., 2007; Dunning et al., 2004; Koriat & Bjork, 2005). This phenomenon was assumed to explain inflated appraisals of current and future performance mostly by learners who failed to reach the standards of adequate performance. Accordingly, poor performers were thought to be "ignorant of their own ignorance" and even "blissfully ignorant" of their weaknesses (Dunning et al., 2003; Kennedy et al., 2002; Kruger & Dunning, 1999). Interestingly, evidence has emerged that although poor performers are less accurate in predicting their grades than good performers (Schlösser et al., 2013), they are not "blissfully ignorant" of their weaknesses (Dunning et al., 2003; Dunning, 2011; Kennedy et al., 2002; Williams, 2004). On the contrary, they display little confidence in their optimistic predictions (Miller & Geraci, 2011b). Thus, they are likely to know that they do not know. Their inflated predictions of performance resemble wishful thinking, which perhaps is used to shield, albeit temporarily, their self-image from the bad news they are about to confront. Wishful thinking is the reflection of a pervasive phenomenon known as "optimism bias," which underlies people's tendency to overestimate the likelihood of positive events and underestimate the likelihood of negative events (Sharot, 2011). Irrespective of what drives poor performers to make inflated estimations (unawareness of one's weaknesses or merely wishful thinking), the likely outcome is inertia. Namely, neither cognition enhances the chances that corrective measures will be contemplated and executed. Remedies for over-estimations of future performance have, by and large, targeted metacognitive awareness with some success. Evidence exists, for instance, that simple interventions that compel poorly performing students to reflect on their performance expectations, through comparison of predicted and actual performance as well as analysis of the sources of discrepancies, can improve the accuracy of prospective self-assessment, and, at times, even performance outcomes (Al Kuhayli et al., 2019; Miller & Geraci, 2011a, 2011b; Pilotti et al., 2019). It was thought that the power of induced self-reflections rested in their ability to make poor performing students "aware" of their biases. However, low confidence in their estimates of performance suggests that the power of induced self-reflections may reside in counteracting wishful thinking (Kruglanski, 1980; Kruglanski & Ajzen, 1983).

In the present study, we examine whether a self-assessment exercise, followed by feedback on actual performance outcomes, can alter the causal attribution habits that students have developed regarding the source(s) of their academic successes and failures. Causal attribution is the process through which we generate

commonsense explanations of behavior (Heider, 1944, 1958). There are three major dimensions upon which people rely to explain behavior that may play a role in learning. Causes may be internal versus external, stable (i.e., permanent) versus variable (i.e., transient), and controllable versus uncontrollable (Weiner, 2000). Internal causes are attributes that a person possesses, which may be stable (e.g., enduring dispositions, such as abilities or personality traits) or variable (e.g., effort). External causes refer to the situation/context in which behavior is expressed, which may be stable (e.g., task difficulty, instructor's bias, etc.) or variable (e.g., luck, help from friends, etc.), depending on the extent to which they can change over time. Causes may also be beyond a person's control (e.g., ability, task difficulty, instructor, luck, etc.) or under his/her control (e.g., effort).

Causal attributions have consequences for test performance, particularly for negative outcomes (Weiner, 1985, 1992). When a student is confronted with poor performance outcomes, the explanation of their source is consequential as it underlies not only the student's willingness to examine the current outcome realistically, thereby learning from her/his mistakes but also the difference between festering inertia and spurring a call to action that can change future outcomes. According to Ditto and Lopez (1992), when learners encounter information with unfavorable implications for the self, such as a bad grade, they tend to treat it skeptically, thereby relying on explanations that mitigate its impact. To be effective, a self-assessment exercise has to counteract learners' motivated skepticism, which may lead them to discount the unflattering information and its implications in favor of rosy accounts that perpetuate their inflated estimations of future performance. Furthermore, if a bad grade is attributed to a transient cause that the learner can personally control (e.g., little effort), not only self-assessment of future performance can be more realistic, as it is unlikely to wound one's self-image, but also a change in the behavior that led to that outcome may be considered (e.g., adjusting studying to conform to the demands of a given course; Kennedy et al., 2002). Alternatively, if the bad grade is attributed to an uncontrollable cause, either internal (e.g., abilities, chronic test anxiety) or external (e.g., a difficult instructor or test), estimates of future performance may reflect a defensive pose. As such, they may be shaped by a self-serving bias, and be unrealistically optimistic. According to expectancy theory (Vroom, 1964), human behavior is motivated by an individual's expectation that exerted effort will lead to desired outcomes. Thus, behavioral changes that can improve learning and test performance will be unlikely if the selected cause is perceived as beyond the learner's control (Rotter, 1966). Not surprisingly, in the educational domain, beliefs in one's own ability to control events (internal locus of control) predict good performance (as measured by grades), whereas beliefs that one's personal circumstances are due to external forces (external locus of control) predict poor performance (Nelson & Mathia, 1995; Osborn & Milbank, 1987).

Causal attribution habits are known to be idiosyncratic to the cultural context in which they are exercised (Choi et al., 1999). According to Chiu (1972), Westerners tend to see individuals as causal agents operating largely independently of the context in which they exist (dispositional preference). Consistent with their locating the responsibility for behavior mostly in the person who exhibits it, Westerners rely on general and abstract dispositions to describe themselves or others (Cousins, 1989). Consequently, dispositions are usually not qualified by considerations of time, role, and situation. In contrast, Easterners tend to see the individual as sensitive to the context in which he/she lives (situational preference). Descriptions of the self or others are consistent with their contextualized view of human agency. As such, descriptions tend to refer to social

identities and be more specific (Cousins, 1989). Dispositional preferences in the West and situational preferences in the Far East are sensitive to the desirability of the outcomes to be explained (Stevenson & Stigler, 1992). In the West, students are likely to take credit for success and attribute failure to the situation, thereby displaying a self-serving bias driven by self-enhancement and self-defensive needs. In the Far East (e.g., Japan, Thailand, and Malaysia), students are likely to attribute success to external factors and failure to internal factors, thereby displaying a self-critical bias (Gobel & Mori, 2007; Mori et al., 2010; Thang et al., 2011).

Yet, the evidence is unclear as to whether individuals of Middle Eastern descent express dispositional or situational preferences. For instance, compared to Westerners, Middle Easterners have been found to prefer situational causes when asked about the sources of poverty (Nasser & Abouchdid, 2001), but to prefer dispositional causes when asked about a person's responsibility for a crime (Hannikainen et al., 2019). In the Middle East as well as in the Far East, individuals have also been reported to prefer internal explanations for both successes and failures (Brown et al., 2005), a pattern that contradicts the self-enhancing attributional pattern of Westerners, whereby successes are internally caused and failures are externally caused. However, Mohammadi and Sharififar (2016) reported that although Middle Eastern learners attribute their success and failure to both internal and external factors, they give priority to external factors. Research evidence not only is mixed but also comes from areas with diverse traditions and customs, such as Lebanon (Nasser & Abouchdid, 2001), Turkey (Brown et al., 2005), and Iran (Mohammadi & Sharififar, 2016). It also neglects to address the issue of the prevalence of biculturalism in the youth of the region, which is fostered by the promotion of bilingualism in formal education, as English or French is often taught alongside Arabic at an early age (Drbseh, 2015; Selvi & Yazan, 2017).

Important to note is that, across cultures, a more general type of confidence exists called general self-efficacy. The term refers to learners' confidence in their ability to execute a selected course of action so that a problem can be solved or a task can be accomplished (Bandura, 1989). The relationship between causal attribution and self-efficacy is murky. According to Silver et al. (1995), high self-efficacy individuals are likely to explain desirable outcomes as due to internal factors (e.g., abilities and effort), and undesirable outcomes as due to situational factors, often of a temporary nature. Low self-efficacy individuals tend to concentrate on their deficiencies, see them as internally caused, and are likely to overestimate difficulties (Bandura, 1986). However, Hirschy and Morris (2002), and Camgoz et al. (2008) did not find evidence that self-efficacy predicts causal attribution preferences. Whether a relationship exists between general self-efficacy beliefs and causal attribution preferences in Middle Eastern learners, and if so, its nature, is currently unclear. Interestingly, mixed evidence also exists from the Western world regarding whether general self-efficacy contributes to the accuracy of students' performance estimations and subjective confidence. Avhustiuk et al. (2018) found that students' general self-efficacy increased with the accuracy of self-assessment, whereas Hamann et al. (2020) reported that it contributed to inaccuracies of self-assessment and to the confidence with which students made estimates. In the Middle East, Al Kuhayli et al. (2019) and Pilotti et al. (2019) reported no relationship between general self-efficacy and estimation accuracy or confidence. However, Pilotti et al. (2019) found that general-self-efficacy contributed to test grades, suggesting that it may motivate behavior rather than regulate behavior via metacognition. These inconsistencies demand further examination.

## **The Present Study**

In the present study, we examine college students who are natives of the Kingdom of Saudi Arabia (KSA) for two interrelated reasons. First, they have been mostly neglected in the literature. Second, and more broadly, as residents of KSA, they are experiencing, similar to most populations in the global south, a time of entanglement, wherein a “traditional” culture overlaps with the forces of modernity, whose principles do not always coincide with local norms and values. In KSA, the forces of tradition demand conformity to the Islamic principles of collectivism and equality, and the forces of modernity reflect the Western principles of individualism and inequality (De Jong & Moaddel, 2013; Haykel et al., 2015; Moaddel, 2010). Tradition echoes a worldview in which one’s in-group (e.g., extended family, tribe, etc.) is a closely integrated entity that gives protection but demands enduring loyalty (Hofstede & Hofstede, 2005). Group affiliation is a key source of identity (Markus & Kitayama, 1991) that defines an interdependent self for whom it is important to fit in and restrain oneself to maintain social harmony. Modernity instead reflects the values of individual freedom, uniqueness, personal fulfillment, autonomy, and competition. As such, adherence to tradition may encourage situational (i.e., external) attributions of responsibility, whereas adherence to modernity may promote dispositional (i.e., internal) attributions.

To examine the effectiveness of an exercise requiring reflection on self-assessment, baseline information is first collected regarding students’ causal attribution preferences, cultural orientation, and self-efficacy. Then, classes taught by the same instructor are randomly assigned to a self-assessment exercise condition or a business-as-usual control condition. In the former, students predict their midterm test grades, rate their confidence in such predictions, and are asked to reflect on discrepancies between predictions and actual performance when reviewing their graded tests. In the latter, students are asked to merely review their graded tests. At the end of the semester, all students predict their final test grades.

This exercise is expected to improve the accuracy of students’ estimations of final test performance, confidence in such estimations, and even actual test performance (Al Kuhayli et al., 2019; Miller & Geraci, 2011a, 2011b; Pilotti et al., 2019). If extant findings are replicated, we ask whether the effectiveness of this simple intervention depends on whether it changes students’ causal attribution habits. To understand the role of causal attribution in self-assessment and its malleability, both at the beginning and at the end of the semester (prior to the final test), students’ causal attribution preferences for good and bad grades are collected. The basic assumption upon which our investigation relies is that each learner is a “constructive thinker” or “naive scientist” who aspires to understand the causes of events to guide her/his actions (Heider, 1958). This assumption drives the following hypotheses:

- a. Based on the evidence of earlier research, we predict three distinct patterns of individual differences. First, across conditions, poor final test performance, relative to proficient final test performance, will be associated with lower accuracy of self-assessment and subjective confidence (see Al Kuhayli et al., 2019; Miller & Geraci, 2011a, 2011b; Pilotti et al., 2019). Second, when asked to explain desirable and undesirable grades, distinct causal attribution patterns will be exhibited by poor and proficient performers (Nelson & Mathia, 1995; Osborn & Milbank, 1987). Third, if self-efficacy beliefs and causal attribution are linked (as

suggested by Silver et al., 1995), distinct causal attribution patterns will be exhibited by individuals with high and low self-efficacy.

b. If the self-assessment exercise improves metacognitive awareness, poor performers' estimation accuracy will increase and confidence will decrease, suggesting awareness of competency. If it also improves metacognitive control, performance improvement in the final test performance will be observed.

c. Based on earlier findings (Al Kuhayli et al., 2019; Pilotti et al., 2019), the difference between high and low general self-efficacy is not expected to impact the accuracy of self-assessment estimates or the confidence expressed in these estimates. As such, it is not likely to modulate the impact of the self-assessment exercise. However, if it differentiates students' test performance, self-efficacy can be said to motivate behavior rather than shape it through metacognition (see Pilotti et al., 2019).

d. The effectiveness of the exercise will rest on its ability to direct poor-performing students' causal attributions to internal, variable, and controllable causes (e.g., effort) as sources of performance. In fact, if performance is attributed to a transient cause that the student can personally control (e.g., little effort), self-assessment of future performance can be more realistic, as low grades are unlikely to wound one's self-concept, as well as motivate adjustments to the study activities that led to those unsavory grades (Kennedy et al., 2002).

e. The impact of the exercise in self-assessment may depend on the participants' cultural dispositions, which make self-evaluation a more or less familiar activity. Familiarity is known to affect how people think and act (Graybiel, 2008; Zajonc & Markus, 1982). As such, it plays a key role in interventions intended to foster cognitive and behavioral change (Laroche et al., 1996; Rimal & Mollen, 2013). In KSA, cultural and religious customs favor evaluations of one's performance conducted by group members, which can be either direct (e.g., grading by an instructor) or indirect through reliance on models. In contrast, the forces of modernity emphasize, among other things, regular self-appraisal of performance through the detection of successes and failures relative to pre-set goals (Rosenholtz & Rosenholtz, 1981). Thus, within the mindset favoring tradition, self-evaluation is a foreign activity to be viewed with skepticism, whereas within the mindset favoring modernity, it is a known entity to be practiced with ease (Zajonc & Markus, 1982).

## **Method**

### **Participants**

Participants were female undergraduate students ( $n = 984$ ) who were enrolled in a general education course at a University located in the Eastern Province of KSA. The sample included students for whom the midterm, final test, and confidence ratings were available (95.07% of the enrolled students). Participants' age ranged from 18 to 25. They were Arabic-English bilingual speakers whose English competency had been verified through standardized tests prior to admission. Through the filter of the English language, participants gained exposure to Western culture from a young age. Cultural encounters encompassed formal education, media, trips abroad, and exchanges with expatriates. Due to gender-segregation rules, a corresponding male sample was unattainable. The study was conducted under the purview of the Deanship of Research. Treatment of participants complied with the guidelines of the Office for Human Research Protections of the U.S. Department of Health and Human Services as well as the code of ethics of the American Psychological Association.

**Procedure and Materials**

Convenience sampling (i.e., consent of the instructor, and minimal or absent overlap of students) was used to select undergraduate courses of the general education curriculum. This selection allowed researchers to include students from across the university to ensure adequate representation of all its constituents. For each instructor, sections of the same course were randomly assigned to either a self-assessment exercise condition (n = 445) or a control condition (n = 539) to ensure parity of teaching activities and styles. As per institutional guidelines, all classes required a midterm test and a final test, which included a mixture of short-answer and multiple-choice questions intended to assess not only retention and understanding of key information, but also active use of knowledge, such as application, analysis, and evaluation (Bloom 1976). Steps were taken to obtain comparable conditions at the start of the experiment. For instance, to ensure that students who participated did not find themselves in two conditions at the same time, or even participated in the same self-assessment exercise more than once, introductory general education courses taught during a semester were selected. Courses of comparable contents, emphasizing basic academic skills (e.g., writing, speaking, reasoning, etc.) across a wide range of topics, were chosen to minimize the likelihood of type of course being a confounding factor. Important to note though is that in pilot work and earlier studies (Al Kuhayli et al., 2019; Pilotti et al., 2019), the type of general education course did not matter when the effectiveness of the self-assessment treatment was measured. Class sizes ranged from 15 to 40 students. As seen in Table 1, the investigation involved 4 phases.

Table 1. The Phases

<i>Exercise Condition</i>	<i>Assessment Tools</i>	
<i>Phase 1</i>	NGSE Inventory	
	Culture Orientation Scale	
	Causal Attribution Questionnaire	
<i>Phase 2</i> Midterm Test	<i>Estimation of Test Grades</i>	<i>Confidence in Estimation</i>
	Prospective Accuracy	Prospective Confidence
	Retrospective Accuracy	Retrospective Confidence
After Test Scoring	Performance Feedback	Discussion of predicted outcomes
<i>Phase 3</i>	Causal Attribution Questionnaire	
<i>Phase 4</i> Final Test	<i>Estimation of Test Grades</i>	<i>Confidence in Estimation</i>
	Prospective Accuracy	Prospective Confidence
	Retrospective Accuracy	Retrospective Confidence
<i>Control Condition</i>	<i>Assessment tools</i>	
<i>Phase 1</i>	NGSE Inventory	
	Culture Orientation Scale	
	Causal Attribution Questionnaire	
<i>Phase 2</i> Midterm Test		
After Test Scoring	Performance Feedback	
<i>Phase 3</i>	Causal Attribution Questionnaire	
<i>Phase 4</i> Final Test	<i>Estimation of Test Grades</i>	<i>Confidence in Estimation</i>
	Prospective Accuracy	Prospective Confidence
	Retrospective Accuracy	Retrospective Confidence



Phase 1 was initiated during the first two weeks of the semester. It served to collect baseline data. All students, irrespective of the condition to which they were assigned, completed the New General Self-Efficacy (*NGSE*) inventory (Chen et al., 2001; Chen et al., 2000), which measured students' general confidence in their ability to deal with a broad range of life challenges (Cronbach's Alpha = .80). The inventory required students to report the extent to which they agreed with each of eight statements of general confidence on a scale from strongly disagree (1) to strongly agree (5). Students also answered questions regarding the sources of their best and worst performance through the causal attribution questionnaire of McClure et al. (2011; Cronbach's Alpha = .60).

The questionnaire asked them to think back to the time when they received their best grade or worst grade on a test. Their task was to rate the contribution of seven causes to each type of grade on a scale from 0 (not at all) to 6 (entirely): ability, effort, test (either difficulty or ease), luck, family, instructor, and friends. Lastly, students completed a 16-item scale measuring one's orientation towards collectivism or individualism (Triandis & Gelfand, 1998; Cronbach's Alpha = .78). The scale assessed the following types of beliefs about the self on a range from 0 (never) to 8 (always): Vertical collectivism (seeing yourself as a member of a hierarchically organized collective and willing to accept its inequalities), vertical individualism (seeing yourself as independent, but also accepting of societal inequalities), horizontal collectivism (seeing yourself as a member of a collective where all members are viewed as equal), and horizontal individualism (seeing yourself as independent, but believing that all people are equal). On this scale, 4 was the neutral point.

In Phase 2 of the exercise condition, before starting the midterm test and after having completed it, students predicted their performance. For both prospective and retrospective estimates, students also expressed their confidence in the prediction made. To accomplish this task, students assigned to the exercise condition were given a sheet to use to predict their grade (see Hacker et al., 2000) on a scale from 0 to 100 as well as to express their confidence in the prediction made on a scale from 0 (not at all confident) to 4 (extremely confident). Estimates of grades, which were made both before and after the midterm test, were used to determine students' accuracy of self-assessment by comparing estimates to actual grades. Reports of confidence indicated the extent to which such estimates were trusted by the students who made them (i.e., subjective confidence).

In the control condition, students completed the midterm test without estimates. Thus, the control condition, where students did not predict their grades in Phase 2, offered a "business-as-usual" setting against which the effects of the self-assessment exercise could be measured. In both conditions, instructors discussed the content of the midterm test upon returning it to students to ensure adequate performance feedback (see Mahrous & Ahmed, 2010). However, in the exercise condition, estimates and confidence ratings were also returned to students so that information was on hand to inform future predictions. As a class exercise, students were encouraged to reflect on discrepancies between predictions and actual performance, and, where needed, to consider remedies either by themselves or with the aid of the instructor. They were informed that explicit and periodic assessment of their performance followed by self-reflection would be an opportunity to understand what they learned in relation to the demands of the curriculum of any of the courses in which they were enrolled.

Phase 3 took place during the last two weeks of the semester. All students, irrespective of the condition to which they were assigned, answered again the two sets of questions regarding their best and worst grades of the causal attribution questionnaire (Cronbach's Alpha = .66). Phase 4 was implemented during the administration of the final test at the end of the semester. Before and after the test, students predicted their performance as well as expressed their subjective confidence in the predictions made.

Across all phases, before students made any estimates, they were reminded to report what they reasonably believed to be their grade at the time of the inquiry. They were explicitly discouraged from reporting what they wished their grade to be. The aim of these instructions was to reduce the temptation of aspirational predictions. In addition, all self-assessment materials displayed Arabic text alongside English text to make students comfortable with the materials, as well as ensure adequate comprehension. All materials had been converted into Arabic by three independent translators familiar with metacognition constructs and instruments who were recruited to ensure a culturally appropriate, native, and accurate translation.

To assess students' subjective understanding of each cause, a focus group was run. Twenty additional students were selected through convenience sampling from the population targeted by the present study, but not included in the pool of its participants. They were given the causal attribution questionnaire (McClure et al., 2011) to fill out and were asked to explain their understanding and views of the contribution (0-6) of the seven causes (ability, effort, test, luck, family, instructor, and friends) to each type of grade. In structured interviews, students reported that they saw their family as mostly facilitating their success in college, whereas friends as distracting from school-related work and accomplishments. They also reported that they saw instructors as either promoting or hurting their academic success, depending on whether they were "kind", "helpful" and "competent". Luck was not seen as randomness. Rather it was mentioned as an expression of "Inshallah", a belief that human agency is governed by a higher authority.

## **Results**

All results described below were considered significant at the .05 level. In analyses of variance (ANOVA), significant results were followed by tests of simple effects, which were submitted to the Bonferroni inequality procedure to adjust for familywise alpha (Cohen, 2001).

### **Start of the Semester: Baseline Measures**

To determine whether an equitable baseline existed, participants' midterm performance (collected in Phase 2), self-efficacy, cultural orientation, and causal attribution patterns (collected in Phase 1) were examined. A one-way ANOVA with condition as the factor indicated that midterm test performance did not vary between the control condition ( $M = 82.48\%$ ,  $SEM = .72$ ) and the self-assessment exercise condition ( $M = 81.41\%$ ,  $SEM = .79$ ),  $F = 1.02$ , *ns*. Similarly, no differences between conditions were found for self-efficacy ( $M = 3.94$ ,  $SEM = .02$ ;  $M = 3.94$ ,  $SEM = .02$ ),  $F < 1$ , *ns*. A 2 (condition) X 4 (cultural orientation) mixed factorial ANOVA yielded a main effect of cultural orientation though,  $F(3, 2946) = 708.02$ ,  $MSE = 1.29$ ,  $p < .001$ ,  $\eta_p^2 = .419$ . Tests of

simple effects illustrated that vertical individualism was the least endorsed ( $M = 4.58$ ,  $SEM = .05$ ) relative to horizontal individualism ( $M = 6.49$ ,  $SEM = .03$ ), horizontal collectivism ( $M = 6.37$ ,  $SEM = .04$ ), and vertical collectivism ( $M = 6.63$ ,  $SEM = .04$ ),  $ts \geq 29.48$ ,  $p < .001$ . It is not surprising that participants who are Arabic-English bilingual speakers, and thus individuals who are familiar with Western culture, emerged as culturally mixed. They appeared to view themselves as both collectivistic and individualistic beings, but with a selective tolerance for societal inequalities. Namely, inequalities were accepted as far as interdependence (i.e., connectedness among individuals) was recognized and valued. Although cultural orientation mattered, neither condition yielded a main effect nor did cultural orientation differ between conditions,  $F_s \leq 1.54$ ,  $ns$ .

A 2 (condition) X 7 (cause) mixed factorial ANOVA conducted on best grades in Phase 1 exhibited a main effect of cause,  $F(6, 5892) = 724.01$ ,  $MSE = 2.24$ ,  $p < .001$ ,  $\eta p^2 = .424$ , and no main effect of condition or a significant interaction,  $F_s < 1$ ,  $ns$ . The same ANOVA performed on worst grades also yielded a main effect of causal attribution,  $F(6, 5892) = 411.14$ ,  $MSE = 3.06$ ,  $p < .001$ ,  $\eta p^2 = .295$ , and no main effect of condition or a significant interaction,  $F_s \leq 1.56$ ,  $ns$ . Main effects underlined the fact that best grades tended to be preferentially attributed to effort, abilities, and instructor, whereas worst grades tended to be preferentially attributed to the difficulty of the test, the instructor, and effort (see Table 2). Thus, consistent with the self-serving bias of Westerners (Cousins, 1989), the top two preferred explanations for desirable outcomes were internal and those for undesirable outcomes were situational. Yet, at the start of the research, there were no differences between conditions in midterm test performance, self-efficacy, cultural orientation, and causal attribution.

Table 2. Mean and Standard Error of the Mean of Causal Attribution Preferences by Type of Grade, Cause, and Phase (Values are Ranked to Illustrate Preferences)

<i>Causes</i>	<i>Phase 1 Control</i>	<i>Phase 1 Self-Assess</i>	<i>Phase 1</i>	<i>Phase 3 Control</i>	<i>Phase 3 Self-Assess</i>	<i>Phase 3</i>
<i>Best Grade</i>						
Effort	5.20 (.04)	5.23 (.05)	5.22	5.18 (.04)	5.26 (.05)	5.22
Abilities	4.98 (.05)	4.96 (.05)	4.97	4.88 (.05)	4.90 (.05)	4.89
Instructor	4.27 (.06)	4.29 (.07)	4.28	4.41 (.06)	4.54 (.07)	4.48
Test	3.26 (.07)	3.35 (.08)	3.31	3.64 (.06)	3.50 (.07)	3.57
Family	2.65 (.09)	2.60 (.10)	2.63	2.73 (.09)	2.64 (.09)	2.69
Luck	2.20 (.08)	2.23 (.09)	2.22	2.47 (.08)	2.40 (.08)	2.44
Friends	2.18 (.08)	2.10 (.09)	2.14	2.13 (.08)	2.02 (.09)	2.08
<i>Worst Grade</i>						
Test	4.42 (.07)	4.57 (.08)	4.50	4.47 (.06)	4.48 (.07)	4.48
Instructor	3.80 (.08)	3.64 (.09)	3.72	3.44 (.08)	3.31 (.09)	3.38
Effort	2.98 (.08)	3.20 (.09)	3.09	3.31 (.08)	3.44 (.09)	3.38
Abilities	2.40 (.07)	2.52 (.08)	2.46	2.78 (.07)	2.85 (.08)	2.82
Luck	2.33 (.09)	2.28 (.10)	2.31	2.49 (.08)	2.28 (.09)	2.39
Family	2.19 (.09)	2.13 (.10)	2.16	2.34 (.09)	2.28 (.10)	2.31
Friends	0.94 (.06)	1.08 (.07)	1.01	1.21 (.07)	1.17 (.07)	1.19

*Note:* ability (internal, stable, and uncontrollable), effort (internal, variable, and controllable), test (external, stable, and uncontrollable), luck (external, variable, and uncontrollable), family (external, stable, and uncontrollable), instructor (external, stable, and uncontrollable), and friends (external, stable, and uncontrollable); Thang et al., 2011.

General self-efficacy, which is learners' confidence in their ability to execute a selected course of action to solve a problem or complete a task (Bandura, 1989), was further examined to clarify its relationship with causal attribution of desirable and undesirable outcomes. To assess this relationship, a median split was applied to students' self-efficacy scores.

Table 3. Regression Analyses with Self-Efficacy as the Outcome Variable and Causal Attribution Preferences at Phase 1 as the Predictors for Low- and High-Confidence Learners

<i>Desirable Outcome – Low Conf. Learner</i>	<i>B</i>	<i>SE</i>	<i>Beta</i>	<i>T</i>	<i>Sig.</i>
Constant	+3.237	.068			
Abilities	+.040	.010	+.184	+3.84	< .001
Effort	+.018	.011	+.082	+1.68	<i>ns</i>
Test	-.002	.008	-.013	-.26	<i>ns</i>
Luck	-.010	.007	-.068	-1.35	<i>ns</i>
Family	+.005	.006	+.039	+.83	<i>ns</i>
Instructor	+.011	.008	+.063	+1.37	<i>ns</i>
Friends	+.008	.006	+.057	+1.22	<i>ns</i>
<i>High Conf. Learner</i>					
Constant	+4.099	.099			
Abilities	+.051	.016	+.158	+3.17	.002
Effort	-.001	.017	-.004	-.08	<i>ns</i>
Test	-.008	.010	-.043	-.82	<i>ns</i>
Luck	+.002	.008	+.011	+.21	<i>ns</i>
Family	+.011	.007	+.075	+1.56	<i>ns</i>
Instructor	-.007	.010	-.034	-.71	<i>ns</i>
Friends	-.013	.008	-.079	-1.63	<i>ns</i>
<i>Undesirable Outcome – Low Conf. Learner</i>					
Constant	+3.579	.042			
Abilities	-.002	.007	-.013	-.29	<i>ns</i>
Effort	-.014	.006	-.101	-2.17	.030
Test	+.017	.008	+.107	+2.12	.035
Luck	-.004	.006	-.031	-.66	<i>ns</i>
Family	-.004	.005	-.031	-.67	<i>ns</i>
Instructor	+.001	.006	+.006	+.12	<i>ns</i>
Friends	-.022	.008	-.127	-2.73	.007
<i>High Conf. Learner</i>					
Constant	4.416	.050			
Abilities	-.017	.008	-.102	-2.12	.034
Effort	-.009	.007	-.055	-1.16	<i>ns</i>
Test	-.011	.009	-.063	-1.23	<i>ns</i>
Luck	-.015	.007	-.104	-2.11	.035
Family	+.006	.006	+.042	.90	<i>ns</i>
Instructor	+.006	.008	+.036	.72	<i>ns</i>
Friends	+.007	.010	+.033	.67	<i>Ns</i>

Note: Desirable outcomes: low-confidence,  $R = .265$ , and high-confidence,  $R = .188$ . Undesirable outcomes: low-confidence,  $R = .212$ , and high-confidence,  $R = .182$ .

A linear regression analysis with general self-efficacy as the outcome variable and causal attribution preferences

for best or worst grades as the predictors was then performed on low-confidence learners ( $M = 3.57$ ,  $SEM = .01$ ) and high-confidence learners ( $M = 4.31$ ,  $SEM = .01$ ) separately (see Table 3). It was found that the attribution of desirable outcomes to abilities (an internal stable cause) contributed to self-efficacy, irrespective of students' self-confidence level. However, for low-confidence learners, a negative relationship existed between self-efficacy and attribution of undesirable outcomes to lack of effort or distraction by friends, whereas a positive relationship existed between self-efficacy and attribution of undesirable outcomes to test difficulties, allowing them to save face. For high-confidence learners, attribution of undesirable outcomes to either lack of abilities or luck was negatively related to their self-efficacy.

The overall picture that emerged from these regression analyses is learners' self-serving stance towards outcomes judged as pleasing to the self. Yet, low- and high-confidence learners emphasized different explanations for worst grades. With one exception, these explanations were related to diminished self-efficacy.

**End of the Semester: Final Test Performance, Prediction Accuracy, and Confidence**

The scores of the final test were used to divide the students into quartiles of performance (see Table 4). Each student's prediction accuracy was defined as the difference between the predicted score and the actual score. As such, positive numbers indicated over-estimation, and negative numbers indicated under-estimation.

Table 4. Mean and Standard Error of the Mean (in Parentheses) of Final Test Performance by Condition and Performance Level

Level	Control		Self-Assessment		Diff
	<i>M</i>	<i>SEM</i>	<i>M</i>	<i>SEM</i>	
1 (Lowest) *	56.95	(.72)	72.78	(.82)	+15.83
2 (Low) *	82.44	(.76)	86.21	(.86)	+3.77
3 (High) *	90.20	(.76)	91.25	(.79)	+1.05
4 (Highest)	97.15	(.75)	97.00	(.82)	-0.15

Note: \* Significant difference between self-assessment and control conditions (as displayed in the last column),  $t_s \geq 5.38$ ,  $p < .001$ .

A 2 (condition) X 4 (performance level) ANOVA yielded a main effect of condition,  $F(1, 976) = 85.66$ ,  $MSE = 74.60$ ,  $p < .001$ ,  $\eta_p^2 = .081$ , a main effect of performance level,  $F(3, 976) = 646.24$ ,  $MSE = 74.60$ ,  $p < .001$ ,  $\eta_p^2 = .665$ , and a significant interaction,  $F(3, 976) = 44.75$ ,  $MSE = 74.60$ ,  $p < .001$ ,  $\eta_p^2 = .121$ . Tests of simple effects indicated that performance was better in the self-assessment exercise condition for all performers except those in the high performance quartile.

Students' accuracy and subjective confidence are reported in Table 5. A 2 (condition) X 4 (performance level) X 2 (time of estimation) ANOVA was conducted on prediction accuracy. Prospective estimates and confidence ratings were made before taking the final test, whereas retrospective estimates and confidence ratings were made after the test. Overall, accuracy improved after having taken the test,  $F(1, 976) = 32.10$ ,  $MSE = 41.32$ ,  $p$

<.001,  $\eta_p^2 = .032$ , was greater in the self-assessment exercise condition than in the control condition,  $F(1, 976) = 35.09$ ,  $MSE = 334.43$ ,  $p < .001$ ,  $\eta_p^2 = .035$ , and moved from over-estimation to underestimation as performance improved,  $F(3, 976) = 119.41$ ,  $MSE = 334.43$ ,  $p < .001$ ,  $\eta_p^2 = .268$ . Time of estimation interacted with performance level,  $F(3, 976) = 11.44$ ,  $MSE = 41.32$ ,  $p < .001$ ,  $\eta_p^2 = .034$ . Relative to before the test, estimates after the test were overall more conservative but only for the lowest and high performers ( $t_s \geq 4.55$ ,  $p < .001$ ). Lastly, condition interacted with performance level,  $F(3, 976) = 19.62$ ,  $MSE = 334.43$ ,  $p < .001$ ,  $\eta_p^2 = .057$ . For poor performers, over-estimations declined from the control condition to the self-assessment exercise condition. This improvement in accuracy was not observed in other students (other  $F_s \leq 1.37$ ,  $ns$ ).

Table 5. Mean and Standard Error of the Mean of Estimation Accuracy and Confidence of Final Test Performance by Condition, Performance Level, and Time of Estimation

Level	Prospective	Retrospective		Prospective	Retrospective	
	Control	Control		Self-Assess	Self-Assess	
<i>Accuracy (%)</i>						
1-Lowest *	+25.36 (1.14)	+21.07 (1.15)	+23.22	+9.32 (1.29)	+5.48 (1.31)	+7.40
2-Low	+1.08 (1.19)	+87 (1.20)	+98	+1.20 (1.35)	-.92 (1.37)	+.14
3-High	+1.04 (1.20)	-1.52 (1.21)	-.24	-.86 (1.24)	-2.36 (1.25)	-1.61
4-Highest	-4.62 (1.18)	-4.46 (1.19)	-4.54	-6.74 (1.29)	-5.60 (1.31)	-6.17
<i>Confidence (0-4)</i>						
1 (Lowest)	1.99 (.08)	1.86 (.09)	1.93	2.05 (.09)	1.96 (.10)	2.01
2 (Low)	2.08 (.09)	1.97 (.09)	2.03	2.09 (.10)	1.96 (.10)	2.03
3 (High)	2.46 (.09)	2.36 (.09)	2.41	2.29 (.09)	2.26 (.10)	2.28
4 (Highest)	2.54 (.08)	2.40 (.09)	2.47	2.27 (.09)	2.51 (.10)	2.39

Note: \* Significant difference between control and prospective self-assessment conditions,  $t = 6.00$ ,  $p < .001$ .

A 2 (condition) X 4 (performance level) X 2 (time of estimation) ANOVA was also conducted on subjective confidence. Overall, confidence in estimates was greater before the test than after the test,  $F(1, 976) = 4.45$ ,  $MSE = .43$ ,  $p = .035$ ,  $\eta_p^2 = .005$ , and increased as performance level improved,  $F(3, 976) = 15.79$ ,  $MSE = 1.62$ ,  $p < .001$ ,  $\eta_p^2 = .046$ . A significant interaction of time and condition,  $F(1, 976) = 3.89$ ,  $MSE = .43$ ,  $p = .049$ ,  $\eta_p^2 = .004$ , merely underlined a decline in confidence from before to after the test in the control condition ( $M = 2.27$  vs.  $M = 2.15$ ;  $t = 2.93$ ;  $p = .004$ ), whereas confidence in the self-assessment condition remained steadily low ( $M = 2.18$  vs.  $M = 2.17$ ;  $t < 1$ ;  $ns$ ). All other  $F_s \leq 2.13$ ,  $ns$ .

In sum, the effect of the self-assessment exercise relative to the control condition was selective. It improved final test grades except those of students with the highest performance level (a likely ceiling effect), and it reduced over-estimation in students with the lowest performance level. However, the self-assessment exercise did not affect students' subjective confidence in estimates made before or after the test, thereby suggesting that the experience of taking the test did not add to the benefits of the self-assessment experience. In contrast, in the control condition, confidence declined after having taken the test, thereby indicating that knowledge of the test was a useful reality check for students exposed to a "business as usual" assessment atmosphere.

### The Impact of the Self-Assessment Exercise on Causal Attribution

The analyses of causal attribution preferences asked two critical questions: First, whether students' causal preferences changed from Phase 1 to Phase 3 as a function of the self-assessment exercise. Second, whether changes were selective, primarily targeting students with poor final test performance. Descriptive statistics are displayed in Table 2. A 2 (condition) X 7 (cause) X 2 (phase) X 4 (performance level) ANOVA, which was carried out on best grade ratings, illustrated students' preferred explanations (ranked as effort, abilities, instructor, test, family, luck, and friends),  $F(6, 5856) = 1093.27$ ,  $MSE = 2.89$ ,  $p < .001$ ,  $\eta_p^2 = .528$ . Although ratings were overall higher in Phase 3 than in Phase 1,  $F(1, 976) = 9.28$ ,  $MSE = 2.57$ ,  $p = .002$ ,  $\eta_p^2 = .009$ , the significant interaction between phase and cause illustrated that not all explanations experienced an increase,  $F(6, 5856) = 7.18$ ,  $MSE = 1.35$ ,  $p < .001$ ,  $\eta_p^2 = .007$ . In fact, when the differences between Phase 3 and Phase 1 (indices of change) were examined, only test, luck, and instructor (i.e., external causes) exhibited changes in ratings significantly different from 0 ( $ts \geq 3.41$ ,  $p \leq .001$ ). Lastly, no evidence was found to indicate that causal attribution preferences for desirable outcomes changed as a function of condition,  $F_s \leq 1$ , *ns*. However, overall ratings varied as a function of performance level,  $F(3, 976) = 3.23$ ,  $MSE = 6.61$ ,  $p = .022$ ,  $\eta_p^2 = .010$ . Ratings also varied as a function of both performance level and type of cause,  $F(18, 5856) = 1.86$ ,  $MSE = 2.89$ ,  $p = .015$ ,  $\eta_p^2 = .006$ . Although the order of preferences for the different causes remained the same at all performance levels (i.e., effort, abilities, instructor, test, family, luck, and friends), the ratings' relative magnitude varied across levels for different causes (all other  $F_s \leq 1.40$ , *ns*).

A 2 (condition) X 7 (cause) X 2 (phase) X 4 (performance level) ANOVA, which was carried out on worst grade ratings, did not indicate that causal attribution preferences for undesirable outcomes changed as a function of condition and performance level. Namely, the type of cause did not interact with either condition or performance level,  $F_s \leq 1.85$ , *ns*. Ratings illustrated students' preferred explanations (ranked as test, instructor, effort, abilities, luck, family, and friends),  $F(6, 5856) = 579.34$ ,  $MSE = 3.93$ ,  $p < .001$ ,  $\eta_p^2 = .372$ , which differed from those expressed for best grades. Although ratings were overall higher in Phase 3 than in Phase 1,  $F(1, 976) = 9.91$ ,  $MSE = 3.28$ ,  $p = .002$ ,  $\eta_p^2 = .010$ , the significant interaction between phase and cause,  $F(6, 5856) = 13.33$ ,  $MSE = 1.91$ ,  $p < .001$ ,  $\eta_p^2 = .013$ , illustrated that not all explanations experienced an increase. In fact, when the differences between Phase 3 and Phase 1 (indices of change) were examined, both internal causes (i.e., abilities and effort) and external causes (i.e., instructor and friends) exhibited changes in ratings significantly different from 0 ( $ts \geq 3.35$ ,  $p \leq .001$ ). However, whereas the change from Phase 3 to Phase 1 for abilities, effort, and friends was an increase, the change for instructor was a decline. Lastly, students' ratings varied as a function of performance level,  $F(3, 976) = 9.52$ ,  $MSE = 7.86$ ,  $p < .001$ ,  $\eta_p^2 = .028$ , as well as a function of condition and performance level,  $F(3, 976) = 2.63$ ,  $MSE = 7.86$ ,  $p = .049$ ,  $\eta_p^2 = .008$ , but without impact on the causal patterns described above (all other  $F_s \leq 1.91$ , *ns*).

### The Impact of the Self-Efficacy on Final Test Performance, Prediction Accuracy, and Confidence

Lastly, we asked whether high and low self-efficacy differentiated students' test performance, the accuracy that their predictions exhibited, and the subjective confidence with which they were made. As reported earlier, the

median split of participants' self-efficacy allowed researchers to separate them into high and low self-efficacy students. A 2 (self-efficacy level) X 2 (condition) between-subjects ANOVA was conducted on test performance, prospective and retrospective prediction accuracy, and subjective confidence. None of the dependent variables was sensitive to the interaction of self-efficacy level and condition,  $F_s \leq 2.87$ , *ns*. Test performance was the only variable to be affected by both condition,  $F(1, 980) = 34.15$ ,  $MSE = 239.21$ ,  $p < .001$ ,  $\eta p^2 = .034$ , and self-efficacy level,  $F(1, 980) = 15.04$ ,  $MSE = 239.21$ ,  $p < .001$ ,  $\eta p^2 = .015$ . Performance in the exercise condition ( $M = 86.92$ ,  $SEM = .48$ ) was superior to that of the control condition ( $M = 81.16$ ,  $SEM = .82$ ), and among high self-efficacy students ( $M = 85.67$ ,  $SEM = .72$ ) compared with low self-efficacy students ( $M = 81.86$ ,  $SEM = .70$ ). As expected, the accuracy of both prospective and retrospective predictions was sensitive to condition,  $F(1, 980) = 26.29$ ,  $MSE = 276.41$ ,  $p < .001$ ,  $\eta p^2 = .026$ , and  $F(1, 980) = 26.43$ ,  $MSE = 254.45$ ,  $p < .001$ ,  $\eta p^2 = .026$ , but not to self-efficacy level,  $F < 1.38$ , *ns*. Prospective self-assessment and retrospective self-assessment in the exercise condition ( $M = +.69$ ,  $SEM = .57$ ;  $M = -.88$ ,  $SEM = .55$ ) were more accurate than in the control condition ( $M = +6.14$ ,  $SEM = .85$ ;  $M = +4.37$ ,  $SEM = .81$ ). However, prospective and retrospective subjective confidence was sensitive to self-efficacy level,  $F(1, 980) = 21.26$ ,  $MSE = .95$ ,  $p < .001$ ,  $\eta p^2 = .021$ , and  $F(1, 980) = 22.54$ ,  $MSE = 1.13$ ,  $p < .001$ ,  $\eta p^2 = .022$ , but not to condition,  $F < 1.64$ , *ns*. High self-efficacy was accompanied by more confident estimates both before and after the test ( $M = 2.37$ ,  $SEM = .04$ ;  $M = 2.32$ ,  $SEM = .05$ ), whereas low self-efficacy was accompanied by less confident estimates ( $M = 2.08$ ,  $SEM = .04$ ;  $M = 1.99$ ,  $SEM = .05$ ). Thus, in agreement with the findings of Pilotti et al. (2019), self-efficacy contributed to performance, but in the present study it also differentiated participants' subjective confidence.

## **Discussion**

The results of the present study can be summarized in three points: First and foremost, although no significant differences between conditions existed in baseline measures, such as midterm performance, general self-efficacy, cultural orientation, and causal attribution preferences, the self-assessment exercise condition exhibited overall superior final test performance and greater estimation accuracy. Second, changes in performance and estimation accuracy did not apply to all students. Specifically, final test performance was higher in the self-assessment exercise condition for all except the highest performing students, whereas estimation accuracy improved only for the lowest-performing students. Yet, irrespective of the condition to which participants were assigned, as performance declined, students' confidence in their estimates also declined, a change inconsistent with the proposal that poor performers are "blissfully ignorant" of their weaknesses (Dunning et al., 2003; Kennedy et al., 2002; Kruger & Dunning, 1999). Third, no evidence emerged that the self-assessment exercise had changed students' preferred explanations for best and worst grades, even those of poor performers. Unquestionably, students treated desirable and undesirable outcomes differently.

For desirable outcomes, internal causes (i.e., themselves) were at the forefront followed by external causes, such as the instructor and the ease of a test. For undesirable outcomes, external causes (e.g., the difficulty of the test and instructor) were at the forefront followed by internal causes (i.e., effort and abilities). Our findings are consistent with the self-serving bias found in the Western world (Gobel & Mori, 2007; Mori et al., 2010; Stevenson & Stigler, 1992; Thang et al., 2011), whereby the self takes credit for positive results, whereas



situational considerations are used to explain negative results. These findings are not surprising given the mixed cultural orientation of the participants, whereby an individualistic self coexists undisturbed with a collectivistic one. They merely indicate that in matters of academic performance, the individualistic self is particularly active.

How can a change in estimation accuracy coexist with the stability of causal attribution preferences? In the exercise used in our field study, prospective self-assessment focuses learners' attention on the consequences of their current state and then offers them the opportunity to confront the actual consequences (viewing and discussing midterm scores). Since the temporal distance between midterm and final exams is just a few weeks and the format of the exams is similar, the exercise can be used not only to calibrate the estimation accuracy of the final test (metacognitive assessment) but also to better prepare for the test (metacognitive control). Causal attribution preferences, on the other hand, are habits developed throughout a student's educational lifespan. As such, they are unlikely to be shaped by a brief practice experience. Alternatively, the stability of causal attribution preferences may be the byproduct of motivated skepticism. Namely, when an undesirable outcome is faced, self-examination may include the search for alternative explanations, attempts to downplay one's contribution, denial of facts and their implications, etc. In our view, facing an undesirable outcome is an ideally fertile opportunity for learners to acknowledge deficiencies, explore implications, and contemplate solutions. Our self-assessment exercise was intended to make the most of this opportunity.

Yet, it is at this stage that causal attribution habits might have played a powerful role, anchoring students to the familiar inclination of attributing undesirable outcomes mostly to situational factors. Of course, it is unclear whether the impact of the self-assessment exercise on estimation accuracy generalizes to tests beyond the classes where it was performed and to other activities (e.g., assignments) as well. The stability of causal attribution preferences might also be the unintended byproduct of students' completing the causal attribution questionnaire of McClure et al. (2011) twice in a short span of time. However, in pilot work, when we attempted to assess the role of intentional recall of earlier responses after a similar delay, students reported not to remember much, suggesting that if the desire to be consistent drove the responses of the participants of our study, its impact was rather minor.

Regarding the relationship between causal attribution preferences and general self-efficacy, a self-serving bias seems to shape the relationship between the selection of explanations for outcomes judged by their desirability to the self and self-efficacy, but in a less clear-cut fashion than expected based on the extant literature. For both low- and high-confidence learners, abilities contributed positively to self-efficacy when desirable outcomes were considered. A split, however, was observed for causes attributed to undesirable outcomes. High-confidence learners' attributions of undesirable outcomes to an internal stable cause (lack of abilities) or an external variable cause (the fatalism of luck), both of which were judged not to be under the learners' control, were linked to lower self-efficacy. Instead, low-confidence learners' attribution of undesirable outcomes to an internal, variable, and controllable cause (lack of effort, which was described by the focus group as "being lazy") or to an external, stable, and uncontrollable cause (friends, which was interpreted by the focus group as distraction arising from "peer pressure") was linked to lower self-efficacy. Our findings are consistent with the assertion of Silver et al. (1995) that high self-efficacy learners are likely to rely on internal factors to explain

desirable outcomes.

Yet, we found mixed evidence that such learners explain undesirable outcomes with situational factors, often of a temporary nature. According to Abramson et al. (1978), failure entails attributing undesirable outcomes to oneself. The high self-efficacy learners seemed to find the middle ground between acknowledging responsibility, and thus recognizing failure, and lifting it by relying on fatalism. On the contrary, low self-efficacy learners relied on a mixture of factors (effort, friends, and test), thereby using an attribution strategy that Silver et al. (1995) did not contemplate. Based on the focus group's responses, such learners could be described as seeing themselves as either "easily distracted" or "the victims of an unfair test" with the former explanation hurting their self-confidence and the latter protecting it.

In an information processing model where metacognition plays a role, metacognitive awareness (i.e., self-assessment of one's knowledge, cognitive processes, and skills) is generally assumed to inform metacognitive control (i.e., strategic regulation of cognitive resources and activities; Ackerman & Goldsmith, 2011; Tullis & Benjamin, 2011). In such a model, performance improvements depend heavily on the enhancement of cognitive control operations. Our findings are consistent with this model as they demonstrate that practice with self-assessment along with feedback regarding actual outcomes can selectively improve not only the accuracy of self-assessment (i.e., metacognitive awareness) but also the proficiency of poorly performing students. The findings suggest that self-assessment exercises treated as recurring and ordinary activities in the classroom may be beneficial to students in parts of the world that have largely been neglected by cross-cultural research.

Effect sizes were small though, suggesting that sustained practice across several classes and semesters may be a missing ingredient in the current study. Of course, it is still an open question whether the observed changes will endure the passage of time. Lasting changes in self-evaluation and performance may require a greater emphasis on concrete and individualized feedback (Miller & Geraci, 2011a) and regular practice. This is a limitation of our study to be addressed in future research. Our reliance on a female-only sample also questions whether our findings may generalize to male students and, more generally, to Middle Eastern learners of other nationalities. Interestingly, Lundeberg et al. (2000) found no gender differences in the confidence Palestinians placed in retrospective estimates (i.e., judgments regarding the correctness of answers given to test questions). Whether the same null finding applies to KSA students is an unresolved matter. Lastly, the design of our field study may be considered a weakness since it entailed random assignment of classes (albeit taught by the same instructors) to conditions. Yet, we examined the metacognition of actual students for an entire semester. They took actual tests in classes where their performance was not a laboratory exercise of a few hours but had tangible consequences. As such, random assignment of participants was an unattainable aspect of the data collection.

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## References

- Abramson, L. Y., Seligman, M. E., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87*(1), 49–74. <https://doi.org/10.1037/0021-843X.87.1.49>
- Ackerman, R., & Goldsmith, M. (2011). Metacognitive regulation of text learning: On screen versus on paper. *Journal of Experimental Psychology: Applied, 17*(1), 18–32. <https://doi.org/10.1037/a0022086>
- Al Kuhayli, H. A., Pilotti, M. A. E., El-Alaoui, K., Cavazos, S. E., Hassan, S. A. M., & Al-Ghazo, R. (2019). An exploratory non-experimental design of self-assessment practice. *The International Journal of Assessment and Evaluation, 26*(1), 49–65. <https://doi.org/10.18848/2327-7920/CGP/v26i01/49-65>
- Avhustiuk, M. M., Pasichnyk, I. D., & Kalamazh, R. V. (2018). The Illusion of knowing in metacognitive monitoring: Effects of the type of information and of personal, cognitive, metacognitive, and individual psychological characteristics. *Europe's Journal of Psychology, 14*(2), 317–341. <https://doi.org/10.5964/ejop.v14i2.1418>
- Bandura, A. (1986). *Social foundations of thought and action*. Prentice-Hall.
- Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist, 44*(9), 1175–1184. <https://doi.org/10.1037/0003-066X.44.9.1175>
- Bloom, B. S. (1976). *Human characteristics and school learning*. McGraw Hill.
- Brown, R. A., Gray, R. R., & Ferrara, M. S. (2005). Attributions for personal achievement outcomes among Japanese, Chinese, and Turkish university students. *Information and Communication Studies, 33*(1), 1–14.
- Bubic, A., Von Cramon, D. Y., & Schubotz, R. I. (2010). Prediction, cognition and the brain. *Frontiers in Human Neuroscience, 4*(25), 1–15. <https://doi.org/10.3389/fnhum.2010.00025>
- Butz, M. V., Sigaud, O., & Gérard, P. (2003). Anticipatory behavior: Exploiting knowledge about the future to improve current behavior. In *Anticipatory behavior in adaptive learning systems* (pp. 1–10). Springer.
- Camgoz, S. M., Tektas, O. O., & Metin, I. (2008). Academic attributional style, self-efficacy and gender: Across-cultural comparison. *Social Behavior and Personality: An International Journal, 36*(1), 97–114. <https://doi.org/10.2224/sbp.2008.36.1.97>
- Castel, A. D., McCabe, D. P., Roediger III, H. L., & Heitman, J. L. (2007). The dark side of expertise: Domain-specific memory errors. *Psychological Science, 18*(1), 3–5. <https://doi.org/10.2224/sbp.2008.36.1.97>
- Chen, G., Gully, S. M., & Eden, D. (2001). Validation of a new general self-efficacy scale. *Organizational Research Methods, 4*(1), 62–83. <https://doi.org/10.1177/109442810141004>
- Chen, G., Gully, S. M., Whiteman, J. A., & Kilcullen, B. N. (2000). Examination of relationships among trait-like individual differences, state-like individual differences, and learning performance. *Journal of Applied Psychology, 85*(6), 835–847. <https://doi.org/10.1037/0021-9010.85.6.835>
- Chiu, L. H. (1972). A cross-cultural comparison of cognitive styles in Chinese and American children. *International Journal of Psychology, 7*(4), 235–242. <https://doi.org/10.1080/00207597208246604>
- Choi, I., Nisbett, R. E., & Norenzayan, A. (1999). Causal attribution across cultures: Variation and universality. *Psychological Bulletin, 125*(1), 47–63. <https://doi.org/10.1037/0033-2909.125.1.47>
- Cohen, B. H. (2001). *Explaining psychological statistics*. John Wiley & Sons, Inc.

- Cousins, S. D. (1989). Culture and self-perception in Japan and the United States. *Journal of Personality and Social Psychology*, 56(1), 124–131. <https://doi.org/10.1037/0022-3514.56.1.124>
- De Jong, J., & Moaddel, M. (2013). Trends in values among Saudi Youth: findings from values surveys. *Journal of the History of Childhood and Youth*, 6(1), 151–164. <https://doi.org/10.1353/hcy.2013.0015>
- Ditto, P. H., & Lopez, D. F. (1992). Motivated skepticism: Use of differential decision criteria for preferred and nonpreferred conclusions. *Journal of Personality and Social Psychology*, 63(4), 568–584. <https://doi.org/10.1037/0022-3514.63.4.568>
- Drbseh, M. M. (2015). Motivation and attitudes towards learning English as a foreign language: A study of the Middle East Arab University students at Leeds University in UK. *International Journal of Scientific and Research Publications*, 5(12), 236–257.
- Dunning, D. (2011). The Dunning-Kruger effect: On being ignorant of one's own ignorance. In *Advances in experimental social psychology* (Vol. 44, pp. 247–296). Elsevier. <https://doi.org/10.1016/B978-0-12-385522-0.00005-6>
- Dunning, D., Heath, C., & Suls, J. M. (2004). Flawed self-assessment: Implications for health, education, and the workplace. *Psychological Science in the Public Interest*, 5(3), 69–106. <https://doi.org/10.1111/j.1529-1006.2004.00018.x>
- Dunning, D., Johnson, K., Ehrlinger, J., & Kruger, J. (2003). Why people fail to recognize their own incompetence. *Current Directions in Psychological Science*, 12(3), 83–87. <https://doi.org/10.1111/1467-8721.01235>
- Gilbert, D. T., & Wilson, T. D. (2007). Propection: experiencing the future. *Science* 317(5843), 1351–1354. <https://doi.org/10.1126/science.1144161>
- Gobel, P., & Mori, S. (2007). Success and failure in the EFL classroom: Exploring students' attributional beliefs in language learning. In L. Roberts, A. Leah, S. Gürel, S. Tatar & L. Marti (Eds.), *EUROSLA Yearbook 7* (pp. 149–169). John Benjamins Publishing Company.
- Graybiel, A. M. (2008). Habits, rituals, and the evaluative brain. *Annual Review of Neuroscience*, 31, 359–387. <https://doi.org/10.1146/annurev.neuro.29.051605.112851>
- Hacker, D. J., Bol, L., Horgan, D. D., & Rakow, E. A. (2000). Test prediction and performance in a classroom context. *Journal of Educational Psychology*, 92(1), 160–170. <https://doi.org/10.1037/0022-0663.92.1.160>
- Hamann, K., Pilotti, M. A., & Wilson, B. M. (2020). Students' Self-Efficacy, Causal Attribution Habits and Test Grades. *Education Sciences*, 10(9), 231–244. <https://doi.org/10.3390/educsci10090231>
- Hannikainen, I. R., Machery, E., Rose, D., Stich, S., Olivola, C. Y., Sousa, P., ... & Berniūnas, R. (2019). For whom does determinism undermine moral responsibility? Surveying the conditions for free will across cultures. *Frontiers in Psychology*, 10, 2428. <https://doi.org/10.3389/fpsyg.2019.02428>
- Haykel, B., Hegghammer, T., & Lacroix, S. (2015). *Saudi Arabia in transition: Insights on social, political, economic, and religious change*. Cambridge University Press.
- Heider, F. (1944). Social perception and phenomenal causality. *Psychological Review*, 51(6), 358–374. <https://doi.org/10.1037/h0055425>
- Heider, F. (1958). *The psychology of interpersonal relations*. Wiley.
- Hirschy, A. J., & Morris, J. R. (2002). Individual differences in attributional style: The relational influence of self-efficacy, self-esteem, and sex role identity. *Personality and Individual Differences*, 32(2), 183–196.

- [https://doi.org/10.1016/S0191-8869\(01\)00003-4](https://doi.org/10.1016/S0191-8869(01)00003-4)
- Hofstede, G. & Hofstede, G. J. (2005). *Cultures and organizations: Software of the mind*. McGraw-Hill.
- Kennedy, E. J., Lawton, L., & Plumlee, E. L. (2002). Blissful ignorance: The problem of unrecognized incompetence and academic performance. *Journal of Marketing Education*, 24(3), 243–252. <https://doi.org/10.1177/0273475302238047>
- Koriat, A., & Bjork, R. A. (2005). Illusions of competence in monitoring one's knowledge during study. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 31(2), 187–194. <https://doi.org/10.1037/0278-7393.31.2.187>
- Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, 77(6), 1121–1134. <https://doi.org/10.1037/0022-3514.77.6.1121>
- Kruglanski, A. W. (1980). Lay epistemo-logic—process and contents: Another look at attribution theory. *Psychological Review*, 87(1), 70–87. <https://doi.org/10.1037/0033-295X.87.1.70>
- Kruglanski, A. W., & Ajzen, I. (1983). Bias and error in human judgment. *European Journal of Social Psychology*, 13(1), 1–44. <https://doi.org/10.1002/ejsp.2420130102>
- Laroche, M., Kim, C., & Zhou, L. (1996). Brand familiarity and confidence as determinants of purchase intention: An empirical test in a multiple brand context. *Journal of Business Research*, 37(2), 115–120. [https://doi.org/10.1016/0148-2963\(96\)00056-2](https://doi.org/10.1016/0148-2963(96)00056-2)
- Lundeberg, M. A., Fox, P. W., Brown, A. C., & Elbedour, S. (2000). Cultural influences on confidence: Country and gender. *Journal of Educational Psychology*, 92(1), 152–159. <https://doi.org/10.1037/0022-0663.92.1.152>
- Mahrous, A. A., & Ahmed, A. A. (2010). A cross-cultural investigation of students' perceptions of the effectiveness of pedagogical tools: The Middle East, the United Kingdom, and the United States. *Journal of Studies in International Education*, 14(3), 289–306. <https://doi.org/10.1177/1028315309334738>
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98(2), 224–253. <https://doi.org/10.1037/0033-295X.98.2.224>
- McClure, J., Meyer, L. H., Garisch, J., Fischer, R., Weir, K. F., & Walkey, F. H. (2011). Students' attributions for their best and worst marks: do they relate to achievement? *Contemporary Educational Psychology*, 36(2), 71–81. <https://doi.org/10.1016/j.cedpsych.2010.11.001>
- Miller, T. M., & Geraci, L. (2011a). Training metacognition in the classroom: the influence of incentives and feedback on exam predictions. *Metacognition & Learning*, 6(3), 303–314. <https://doi.org/10.1007/s11409-011-9083-7>
- Miller, T. M., & Geraci, L. (2011b). Unskilled but aware: reinterpreting overconfidence in low-performing students. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 37(2), 502–506. <https://doi.org/10.1037/a0021802>
- Moaddel, M. (2010). Religious regimes and prospects for liberal politics: Futures of Iran, Iraq and Saudi Arabia. *Futures*, 42(6), 532–544. <https://doi.org/10.1016/j.futures.2010.01.004>
- Mohammadi, A., & Sharififar, M. (2016). Attributions for success and failure: Gender and language proficiency differences among Iranian EFL learners. *Theory and Practice in Language Studies*, 6(3), 518–524. <https://doi.org/10.17507/tpls.0603.09>

- Mori, S., Gobel, P., Thepsiri, K., & Pojanapunya, P. (2010). Attributions for performance: A comparative study of Japanese and Thai university students. *JALT Journal*, 32(1), 5–28. <https://doi.org/10.37546/JALTJJ32.1-1>
- Nasser, R., & Abouchedid, K. (2001). Causal attribution of poverty among Lebanese university students. *Current Research in Social Psychology*, 6(14), 205–220.
- Nelson, E. S., & Mathia, K. (1995). The relationships among college students' locus of control, learning styles, and self-prediction of grades. *Education Research and Perspectives*, 22, 110–117.
- Osborn, A., & Milbank, J. (1987). *The effects of early education: A report from the child health and education study*. Clarendon Press
- Pilotti, M. A. E., El Alaoui, K., Mulhem, H., & Al Kuhayli, H. A. (2019). The illusion of knowing in college: A field study of students with a teacher-centered educational past. *Europe's Journal of Psychology*, 15(4), 789–807. <https://doi.org/10.5964/ejop.v15i4.1921>
- Rimal, R. N., & Mollen, S. (2013). The role of issue familiarity and social norms: findings on new college students' alcohol use intentions. *Journal of Public Health Research*, 2(1), 31–37. <https://doi.org/10.4081/jphr.2013.e7>
- Rosenholtz, S. J., & Rosenholtz, S. H. (1981). Classroom organization and the perception of ability. *Sociology of Education*, 54(2), 132–140. <https://doi.org/10.2307/2112357>
- Rotter, J. B. (1966). Generalised expectancies for internal versus external locus of control of reinforcement. *Psychological Monographs: General and Applied*, 80, 1–28. <https://doi.org/10.1037/h0092976>
- Schacter, D. L., Addis, D. R., and Buckner, R. L. (2007). Remembering the past to imagine the future: the prospective brain. *National Review of Neuroscience*, 8(9), 657–661. <https://doi.org/10.1038/nrn2213>
- Schlösser, T., Dunning, D., Johnson, K. L., & Kruger, J. (2013). How unaware are the unskilled? Empirical tests of the “signal extraction” counter explanation for the Dunning–Kruger effect in self-evaluation of performance. *Journal of Economic Psychology*, 39, 85–100. <https://doi.org/10.1016/j.joep.2013.07.004>
- Selvi, A. F., & Yazan, B. (2017). English as an international language pedagogy: A sustainable alternative for teaching English in the GCC region. In A. Mahboob & T. Elyas (Eds.), *Challenges to education in the GCC during the 21st century* (pp. 65-90). Gulf Research Center.
- Sharot, T. (2011). The optimism bias. *Current Biology*, 21(23), R941–R945. <https://doi.org/10.1016/j.cub.2011.10.030>
- Silver, W. S., Mitchell, T. R., & Gist, M. E. (1995). Responses to successful and unsuccessful performance: The moderating effect of self-efficacy on the relationship between performance and attributions. *Organizational Behavior and Human Decision Processes*, 62(3), 286–299. <https://doi.org/10.1006/obhd.1995.1051>
- Stevenson, H., & Stigler, J. W. (1992). *The Learning gap: Why our schools are failing and what we can learn from Japanese and Chinese education*. Summit Books.
- Thang, S. M., Gobel, P., Nor, N. F. M., & Suppiah, V. L. (2011). Students' attributions for success and failure in the learning of English as a second language: A comparison of undergraduates from six public universities in Malaysia. *Pertanika Journal of Social Sciences and Humanities*, 19(2), 459–474.
- Triandis, H. C. & Gelfland, M. J. (1998). Converging measurement of horizontal and vertical individualism and collectivism. *Journal of Personality and Social Psychology*, 74(1), 118–128.

<https://doi.org/10.1037//0022-3514.74.1.118>

- Tullis, J. G., & Benjamin, A. S. (2011). On the effectiveness of self-paced learning. *Journal of Memory and Language*, 64(2), 109–118. <https://doi.org/10.1016/j.jml.2010.11.002>
- Vroom, V. C. (1964). *Work and motivation*. John Wiley & Sons
- Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review*, 92(4), 548–573. <https://doi.org/10.1037/0033-295X.92.4.548>
- Weiner, B. (1992). *Human motivation: Metaphors, theory, and research*. Sage
- Weiner, B. (2000). Intrapersonal and interpersonal theories of motivation from an attributional perspective. *Educational Psychology Review*, 12(1), 1–14. [https://doi.org/10.1007/978-1-4615-1273-8\\_2](https://doi.org/10.1007/978-1-4615-1273-8_2)
- Williams, W. M. (2004). Blissfully Incompetent. *Psychological Science in the Public Interest*, 5(3), i–ii. <https://doi.org/10.1111/j.1529-1006.2004.00017.x>
- Zajonc, R. B., & Markus, H. (1982). Affective and cognitive factors in preferences. *Journal of Consumer Research*, 9(2), 123–131. <https://doi.org/10.1086/208905>
- Zell, E., & Krizan, Z. (2014). Do people have insight into their abilities? A metasynthesis. *Perspectives on Psychological Science*, 9(2), 111–125. <https://doi.org/10.1177/1745691613518075>

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