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Testing

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Abstract

The proliferation of online employee selection testing is causing a growing concern for the possibility of cheating. This study examines the interrelationships between personality factors and cheating behavior on unproctored selection testing. Past research has indicated that individuals with high specific self-efficacy are less likely to cheat. It was hypothesized that high levels of both general self-efficacy (GSE) and specific self-efficacy (SSE) predict lower rates of cheating overall. Additionally, Chance et al.'s (2001) study on self-deception demonstrated that students who cheat experience inflated confidence for future performance; this study extends this research by examining the effect cheating has on an individual's level of self-efficacy. Results indicate that, contrary to what was hypothesized, GSE positively correlates with cheating while SSE does not predict cheating. As hypothesized, GSE did not vary following cheating; however, SSE significantly decreased rather than increased following cheating. These findings prompt a number of questions for future research.

TABLE OF CONTENTS

The Roles of Self-Efficacy and Self-Deception in Cheating on Unproctored Internet Testing

Recent global trends have brought the issue of cheating into the foreground of employee selection research. First, the accelerating advance of technology has enabled interactions between people who are separated by distance to become more viable than ever before. Increasingly, colleges offer online courses, consumers shop via the Internet, and companies form relationships with an international market virtually (Carstairs & Myors, 2009; Hollister & Berenson, 2009). The convenience of the Internet has become an expected feature of business interactions, and organizations that adapt are the organizations that flourish—the company's very image has shown to be powerfully tied to its website and the user-friendliness of its online operations (Sinar, Reynolds, & Paquet, 2003). Second, through the use of online job postings, which allow more applicants greater access to information about position vacancies, organizations receive far more job applications than ever before (Beaty, Nye, Borneman, Kantrowitz, Drasgow, & Grauer, 2011). The influx of applications is nearly ubiquitous; most employers, including every Fortune 500 company, offer an online application process, meaning that job applicants have the means to apply to numerous job postings quickly and conveniently (Younger, 2008). Further, most applicants prefer an online application to a traditional application process; a literature review by Anderson (2003) revealed that current studies universally agree that applicants react positively to Internet selection testing.

The demand for the convenience of online interactions, combined with the swelling number of job applicants, exert pressure on organizations to administer selection tests over the Internet, rather than in person. Unproctored Internet testing (UIT) offers the advantages of decreased costs and increased time efficiency by enabling the organization to test a large number of applicants quickly and cheaply (Beaty et al., 2011). However, debate exists about whether

selection testing that is unproctored could have any real utility, as unproctored testing allows the test-taker to cheat easily. Cheating, or general dishonesty, is a seemingly intractable feature of any high-stakes situation. An estimated 70-90% of students admit to cheating at some point in their academic careers (Murdock & Anderman, 2006), and up to 45% of job applicants falsify their work histories (Tippins, 2009). With cheating already representing a major problem in job selection, the additional freedom that UIT grants may only act as another deterrent to selection effectiveness. If the objective of selection testing is to identify the best available candidate for a position, then it would seem nonsensical to sacrifice this utility in favor of efficiency and convenience. Regardless, about two-thirds of employers use Internet testing as part of their online application process (Beaty et al., 2011), meaning that efforts to minimize deleterious effects from cheating on unproctored Internet tests would provide significant benefit to modern employers.

Self-efficacy

Researchers of cheating behaviors often neglect to consider the impact of personality factors, instead focusing on factors such as gender, age, likelihood of detection, and the existence of a cultural honor code (Marsden, Carroll, & Neill, 2005; Thorpe, Pittenger, & Reed, 1999). As an exception to this rule, self-evaluations are considered to have a strong influence on cheating behaviors (Chen, Gully, & Eden, 2004). Self-efficacy in particular helps to explain differences in motivation, task performance, and decision-making that relate to cheating (Chen et al., 2004; Marsden et al., 2005). Albert Bandura, who coined the term in 1977, defined self-efficacy as the "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3). Self-efficacy, then, reflects the belief that a person is able to successfully perform a task. One important distinction to recognize is that self-efficacy

beliefs are not necessarily accurate, as an individual's confidence in being able to perform effectively does not mean that the individual is actually able to do so. When researchers seek to measure self-efficacy, they do not look for objective successes from past performances, but rather gather personal perspectives about future expectations for success (Jex & Gudanowski, 1992). The primary determinant of self-efficacy, enactive mastery, supports the idea that beliefs of self-efficacy do not always reflect objective experiences. Enactive mastery, the composite of both perceived and actual task performance, forms the general feeling of possessing advanced skills that are relevant to task demands. A job applicant who has several years of experience in a related field may have a strong sense of enactive mastery, as her past experiences provide evidence for her probability of success in the job, whereas a job applicant immediately out of college may lack the same degree of enactive mastery, as he does not possess the same experiences of success and failure. In addition to enactive mastery, influences on self-efficacy include information external to the individual's direct task performance, such as persuasion from others (encouragement from peers), vicarious learning (seeing or hearing about someone else succeeding), and emotional arousal (feeling anxious can be interpreted as a signal that the person will not succeed) (Bandura, 1982; Jex & Bliese, 1999).

Beliefs of self-efficacy can influence cheating behaviors in a number of ways. Generally, studies indicate that high self-efficacy acts as a deterrent against cheating behaviors (Elias, 2008; Finn & Frone, 2004; Marsden et al., 2005). At an intuitive level, these findings agree with the conception of self-efficacy, as it is, essentially, the individual's appraisal of his or her ability to meet a demand. Individuals high in self-efficacy are less likely to see a demand as a threat, and more likely to see it as a challenge, and that they can succeed solely through effort and ability (Chemers, Hu, & Garcia, 2001). Resorting to cheating, then, would not represent a necessary

option in their perspective. Besides affording them confidence to meet new challenges, self-efficacy is related to other effects that determine cheating behavior, including achievement orientation and performance level.

Achievement orientation refers to the goals for which individuals strive when working to meet a demand. Individuals with a performance orientation rely on external indicators of success (Niiya, Ballantyne, North, & Crocker, 2008). They feel motivated to demonstrate competency by outperforming others or receiving positive recognition. These individuals do not feel as if they have succeeded unless they have "won" in a competition or have received a good grade. On the other hand, individuals with a mastery orientation identify success by the outcome of their own performance. They seek to learn and master new skills and abilities, and personal development and overcoming obstacles act as markers for success. Studies find that cheating is more often associated with performance orientation than mastery orientation (Marsden et al., 2005; Niiya et al., 2008). The researchers reason that this trend results because mastery-oriented individuals receive motivation directly from the challenge of the task, and cheating does not aid in this kind of endeavor, whereas performance-oriented individuals primarily seek the positive feedback that an artificially inflated score would provide (Niiya et al., 2008).

Marsden et al.'s (2005) findings support the claim that self-efficacy relates to achievement orientation in students. The results showed that high academic self-efficacy significantly relates to mastery orientation (i.e. motivation for learning as opposed to motivation for good grades), and that self-efficacy mediates the relationship between achievement orientation and learning. Another study claims that the most common reason for academic cheating is to gain good grades (Tas & Tekkaya, 2010), implying that students primarily motivated toward self-development do not share this particular predictor of cheating. Self-

efficacy and achievement orientation are so closely intertwined that some researchers consider

self-efficacy to be a prominent facet of the construct of achievement orientation, reasoning that

individuals driven to develop their own skills must necessarily possess confidence in their ability

to meet challenges and improve their skills (Utsch & Rauch, 2000).

    While self-efficacy beliefs do not depend upon objective performance, they do interact

with objective performance in predicting cheating behaviors. Finn and Frone (2001) found that

students who reported the greatest amount of cheating tended to have high self-efficacy and low

performance. Overall, however, self-efficacy still predicted lower rates of cheating; the students

with high self-efficacy and high performance reported the lowest amount of cheating. Further

studies by Tang and Zuo (1997) support this finding that self-efficacy and performance level

interact in predicting cheating. The researchers postulate that this effect stems from cognitive

consistency theory, which states that people strive to reduce conflicting thoughts by modifying

the sources of tension, or their appraisals of the sources. High self-efficacy individuals hold high

expectations for their performance; when feedback on their performance is negative (in the form

of bad grades in this case), contradicting their expectations, these individuals experience the

greatest drive to resort to cheating in order to improve feedback so that it more closely matches

their expectations. Generally, consistency between expectations and performance level predicts

less cheating, and discrepancy predicts more cheating.

    So why, if those with high self-efficacy combined with low performance are most likely

to cheat, does self-efficacy still correlate negatively with cheating overall? In fact, the group of

individuals with high self-efficacy and low performance tends to be comparatively small.

Generally, individuals high in self-efficacy demonstrate higher levels of performance. Chemers

et al. (2001), for example, found that students with high self-efficacy displayed objectively

greater academic performance, matching their higher expectations for performance. The trend

holds true when applied to work performance as well; studies commonly find positive

correlations between self-efficacy and work and task performance (Jex & Gudanowski, 1992;

Judge, Jackson, Shaw, Scott, & Rich, 2007; Ladebo & Awotunde, 2007). These findings agree

with prior assumptions about the potential benefits of self-efficacy. Because self-efficacy

represents the belief that high performance will result from the application of effort, the

individual then approaches the task with greater confidence, persists for longer in the face of

adversity, and ultimately accomplishes more.

The claim that self-efficacy positively relates to performance is not disputed; however,

some debate exists about the direction of the relationship between self-efficacy and performance.

It could be true that, instead of self-efficacy inspiring increased performance, a previous history

of high performance may cause high self-efficacy—or possibly the relationship is some

combination of the two (Jex, Bliese, Buzzell, & Primeau, 2001). Early conceptions of self-

efficacy acknowledged the possible bi-directionality of self-efficacy (Bandura, 1982). Bandura

did not consider self-efficacy simply as a result of performance, but also that it recursively fed

back into performance, causing people to confidently approach tasks when self-efficacy is high,

and avoid challenges when self-efficacy is low.

Indeed, self-efficacy does demonstrate value for the individual in a work setting—high

self-efficacy individuals appear to be better equipped to handle work overload, perform complex

tasks, and cope with work-related stressors (Judge et al., 2007; Jex et al., 2001). Evidence like

this lends credence to the idea that organizations benefit from hiring employees high in self-

efficacy, and that a selection process that favors low self-efficacy should be discouraged.

Self-efficacy and self-deception

Chance, Norton, Gino, and Ariely (2011) introduce an interesting perspective on the relationship between performance and self-efficacy as it applies to cheating behaviors. Rather than observe how self-efficacy levels relate to cheating as though self-efficacy is a stable condition, the researchers examined how cheating can alter an individual's perceived ability. In the study, the experimental group first completed a math-based test while being given the opportunity to view the answer sheet, while a control group took the test without an answer sheet. As predicted, the experimental group obtained significantly higher scores than the control group. Afterward, both groups were asked to predict their scores on a second test. The experimental group, who obtained inflated scores on the initial test due to seeing the answer key, actually predicted similarly high scores on the second test, even knowing that they would not have the chance to see an answer key next time. In short, the experimental group who engaged in cheating behaviors deceived themselves into thinking that their high scores were due to ability rather than cheating, reasoning that they "knew it all along" (p. 1). Even when the researchers offered monetary incentive to give accurate predictions, respondents still predicted inflated scores, costing them money; even a financial enticement could not temper their self-deception.

Cognitive consistency theory, again, helps explain why cheating can result in self-deception and raised self-efficacy. People tend to have inflated estimates of their ability (Robins & Beer, 2001). Cheating seemingly contradicts this perception, as it seemingly acts as an admission of inability to successfully perform the task. Because, according to cognitive consistency theory, people strive to reduce conflicting thoughts and behaviors, they will justify cheating acts by assuming that they would have succeeded regardless. This mental maneuver maintains their self-efficacy beliefs without admitting unsuccessful performance. When an

individual holds especially high self-efficacy beliefs, this effect is even more prominent, as the discrepancy between performance and belief is greater. This tendency, as illustrated by Chance et al. (2011) suggests that people internalize the success brought about by cheating in a similar way to how they internalize more legitimate successes, heightening their sense of self-efficacy.

Specific and general self-efficacy

Bandura's conception defined self-efficacy as a self-evaluation that specifically reflects a certain task or situation (Bandura, 1977). Mathematics self-efficacy, the domain of self-efficacy explored in the current study, deals with the confidence that an individual has in performing math-related tasks; the same confidence does not extend to other situations, such as reading comprehension. As a result, the majority of self-efficacy research measures self-efficacy as a construct narrowly limited to specific contexts (Chen, Gully, & Eden, 2001). However, over the past decade, a different perspective of self-efficacy emerged. Researchers began to test the idea that another form of self-efficacy, known as general self-efficacy, influenced a broad range of situations, including situations unfamiliar to the individual. Researchers view general self-efficacy as individuals' "tendency to view themselves as capable of meeting task demands in a broad array of contexts" (Chen et al., 2001, p. 63). According to this conception, feelings of self-efficacy can be separated into specific self-efficacy (SSE) and general self-efficacy (GSE), and their effects can be measured independently of each other.

The two distinct constructs develop out of different experiences in the individual's life. SSE forms as a result of past successes or failures (or at least of the perception of success or failure) when performing a particular task (Chen et al., 2001). GSE, on the other hand, accumulates from a variety of different life experiences, each leading to a sense of success or failure. One early measurement of GSE consisted of items assessing confidence in succeeding at

a number of varied activities, including physical and cognitive challenges (Tipton & Worthington, 1984), illustrating the transition in thinking between SSE and GSE. Later GSE scales abandoned items concerning specific tasks in favor of items assessing a general expectation of success as a result of effort and ability (e.g., "When facing difficult tasks, I am certain that I will accomplish them") (Chen et al., 2001). GSE forms when the successes and failures of varied situations allow the individual to generalize his or her feelings of competence to unfamiliar situations (Shelton, 1990). Someone high in GSE, then, is more likely to expect success when faced with a new challenge than someone low in GSE. And, because GSE develops from more numerous and pervasive life experiences than does SSE, it acts as a more permanent trait, resistant to changes brought about by a single instance of success or failure.

The differences between GSE and SSE hold a number of implications for an organization's selection decisions. Jobs are increasingly becoming more complex and broad, so that fewer employees can expect to maintain high performance using only a specific set of skills (Chen et al., 2001). Organizations, then, increasingly value an employee's effectiveness at performing new and unfamiliar tasks, and so the concept of GSE emerges as a useful means of predicting an employee's performance across a variety of work domains.

General self-efficacy and self-esteem

The distinction between GSE and SSE has gained some controversy. Many researchers challenge the idea that GSE is distinct from self-esteem. GSE highly correlates with and appears, conceptually, closely aligned with self-esteem as a form of self-evaluation (Judge, Erez, Bono, & Thoresen, 2002). A meta-analysis conducted by Judge et al. (2002) found an average correlation between GSE and self-esteem of .85. In fact, some researchers suggest that GSE is actually a

component of self-esteem, and that GSE-related items should be included in measures of self-esteem (Locke, McClear, & Knight, 1996).

Proponents of GSE distance the construct from self-esteem by claiming that, unlike self-esteem, which reflects primarily affective components, such as feelings of general self-worth and self-liking, GSE contains cognitive, affective, and motivational components, all of which contribute to a type of self-evaluation used to predict future performance (Chen et al., 2004). In this way, GSE is an individual trait that uniquely acts as a motivating force, and more strongly relates to achievement orientations, whereas self-esteem more closely relates to affective processes. Chen et al.'s (2004) findings support the notion that GSE relates to motivational traits while self-esteem relates to affective traits. Additionally, they found that GSE correlated more highly with work-specific self-esteem than with global self-esteem, indicating that GSE is more relevant to work-based situations, and less relevant to general feelings of worth.

The distinction between GSE as a motivational trait and self-esteem as an affective trait holds a good deal of importance for organizations. Motivational traits offer organizations a helpful heuristic for determining optimal employees for selection. Other motivational traits include conscientiousness, need for achievement, and learning-goal orientation, all strong predictors of successful work performance (Chen et al., 2004). GSE specifically corresponds to an individual's persistence in the face of adversity, as well as adaptation and mastery of new tasks (Chen et al., 2004; Shelton, 1990). Self-esteem, as an affective trait, relates primarily to off-task emotions and cognitions, and provides a less relevant tool for employee selection.

The relationship between GSE and cheating behavior has gone almost entirely unexplored. Many researchers argue that SSE provides the strongest predictive information of cheating behaviors (as well as of most other behaviors) (Elias, 2008; Pajares, 1996). As a result,

SSE has dominated cheating research. However, GSE may potentially hold some influence over cheating behaviors, especially in regard to selection testing. In fact, Chen et al. (2001) designed a general self-efficacy scale specifically with the employee selection process in mind. They reason that, while SSE more strongly impacts specific tasks and situations with which the individual is familiar, GSE plays a greater role when undertaking broader, unfamiliar contexts, including the context of online selection testing. For UIT, GSE likely provides predictive power, as applicants draw upon general expectations of success for their effort.

Mathematics self-efficacy

The decision to focus on mathematics self-efficacy arose in response to participant demographics (undergraduate students) as well as to the universality of at least basic math skills in the United States. Admission standards to colleges and universities specifically target math ability (ACT, SAT, or GRE scores) as a means of predicting student success (Truell & Woosley, 2008). For the purposes of this study, basing a selection test on math ability would ensure that the participants had some degree of familiarity with the test material, meaning that they could provide an appropriate self-efficacy rating.

The study additionally benefits from using a math-based test, in that it will closely simulate cognitive selection tests in practice. Math-related problems exist in most occupations (Hunter & Hunter, 1984), so math ability assessment has become a main staple of selection testing (Bing, Stewart, & Davison, 2009). By utilizing a math-based test, the study's participants will experience a testing situation similar to selection processes used by organizations in practice.

Current study

The majority of cheating research assesses academic cheating behaviors through means of a self-report questionnaire (Kerkvliet & Sigmund, 1999). Research, then, is slanted toward one particular type of cheating that may not generalize to cheating on selection testing, and responses are also subject to the self-report biases of respondents. The current study will provide a different perspective by simulating a selection test situation and by objectively measuring cheating behavior through a laboratory experiment. The study incorporates a specific self-efficacy measure as well as a general self-efficacy measure in order to examine how each affects cheating. Selection testing is simulated by offering a monetary incentive for high scores on the unproctored Internet test. The study varies whether the self-efficacy measures are administered before or after the online test in order to examine both how self-efficacy predicts cheating and how cheating may alter self-efficacy levels.

The proposed hypotheses are outlined below.

H_1: Specific self-efficacy is negatively related to cheating behavior.

H_2: General self-efficacy is negatively related to cheating behavior.

H_3: Participants who cheat and who take the cognitive test first will report higher specific self-efficacy than participants who cheated and who take the cognitive test second.

H_4: Participants who cheat and who take the cognitive test first will report equal levels of general self-efficacy to participants who cheated and who take the cognitive test second.

Method

Participants

A sample of 70 undergraduate psychology students from a small Midwestern university participated in the study in exchange for research credits, as well as a chance to win a $100 prize. Participants were recruited by means of university-implemented human participant pool management software. Participants were required to be able to speak English and have some prior experience with basic mathematic concepts.

Measures

Cheating behavior. The study assessed whether participants cheated on an online math-based test by using a calculator—either the calculator placed in the room, a cell phone calculator, or a computer-based calculator. Cheating was measured by observing participants through a hidden camera and reporting whether a calculator was used. Cheating behavior was measured as a dichotomous variable; either the participant cheated or did not.

Math self-efficacy. Math self-efficacy, representing specific self-efficacy in this study, was measured using a scale developed by Lee (2009). The scale contains 6 items which assess the participant's confidence in various math-related tasks using a 4-point Likert scale, 4 being "Very confident" and 1 being "Not at all confident." One sample item is "How confident do you feel about calculating how much cheaper a TV would be after a 30% discount?" See Appendix A for the full measure.

General self-efficacy. GSE was measured using the New General Self-Efficacy scale (NGSE) created and validated by Chen, Gully, and Eden (2001). A comparison of three measures of GSE by Scherbaum, Cohen-Charash, and Kern (2006) concluded that Chen et al.'s NGSE scale outperformed the other measures in terms of item discrimination, overall efficiency, and amount

of information gained from the items. The scale includes eight items that assess confidence in the individual's general abilities from a 5-point Likert scale. One sample item is "I believe I can succeed at most any endeavor to which I set my mind." See Appendix B for the full measure.

Procedure

Before the participant's arrival, the researcher placed a calculator on a notebook near the computer. Upon arrival, participants were seated in an office room and asked to sign a consent form. They were then instructed to complete an online mathematics test as well as a personality questionnaire, and told that the top scorer will receive $100. Half of the participants were instructed to complete the online mathematics test before the questionnaire, while the other half were instructed to complete the questionnaire before the online mathematics test. The researcher then left the room and closed the door.

After the participants completed the questionnaire and online test, the participant brought the questionnaire to the researcher's office. The researcher then debriefed the participant on the purpose of the study and explained the necessity for the deception. They were then told that the $100 will be given to a randomly selected participant, and the researcher thanked them for their time.

Results

The study had a sample of 69 participants, 74.6% of which were female. 86.4% were Caucasian, 9.1% were African-American, and 4.5% were various other ethnicities. Ages ranged from 19 to 43 with a median of 21.

Participants were chosen randomly as to whether they completed the online mathematics test first or the self-efficacy scales first. 39 participants (56.5%) took the math test first, while 30 took the SE scales first (43.5%). 38 participants (55.1%) cheated on the online math test by using a calculator.

Means, standard deviations, and correlations for all measures are provided in Table 1. The significant positive correlation between general self-efficacy and specific self-efficacy confirms past findings that the two constructs are closely related. Additionally, cheating behaviors negatively correlated with age and positively correlated with GSE.

Table 1
Means, standard deviations, and intercorrelations

Variable	M	SD	1	2	3	4
1. Gender[1]	1.75	.44	-			
2. Age	22.63	5.42	-.02	-		
3. Specific self-efficacy	2.84	.53	.00	-.09	-	
4. General self-efficacy	4.16	.52	.04	-.08	.29*	-
5. Cheating[2]	.54	.50	-.04	-.33**	.15	.33**

* Correlation is significant at the .05 level
**Correlation is significant at the .01 level
[1]1 = male; 2 = female
[2]0 = no cheating; 1 = cheating

Hypotheses 1 and 2

H_1: *Specific self-efficacy is negatively related to cheating behavior.*

H_2: *General self-efficacy is negatively related to cheating behavior.*

In order to test H_1 and H_2, a hierarchical logistic regression was run, using cheating as the dependent variable and entering the covariate Age at Step 1, and entering specific self-efficacy scores and general self-efficacy scores at Step 2. Table 2 shows each predictor's odds ratio and significance levels, and R^2 values for each step. Table 3 shows the means and standard deviations, which are depicted in Figure 1. Overall, the model using all predictors was able to accurately predict cheating behavior for 67.7% of participants (compared to 53.8% with no predictors), $\chi(3)=17.27$, $p<.01$. H_1 was unsupported, as specific self-efficacy was not a significant predictor. H2 was also unsupported, as general self-efficacy predicted cheating behavior in the opposite direction as hypothesized, such that higher levels of GSE were associated with cheating behavior.

Table 2

Exp(B) values, significance levels, and R^2 values for predictors of satisfaction

Predictor	ΔR^2	Exp(B)	p
Step 1	.163		.004
Age		.83	.034
Step 2	.312		.001
Age		.84	.042
Specific self-efficacy		1.08	.887
General self-efficacy		5.12	.012

Table 3

Means and standard deviations for self-efficacy and cheating

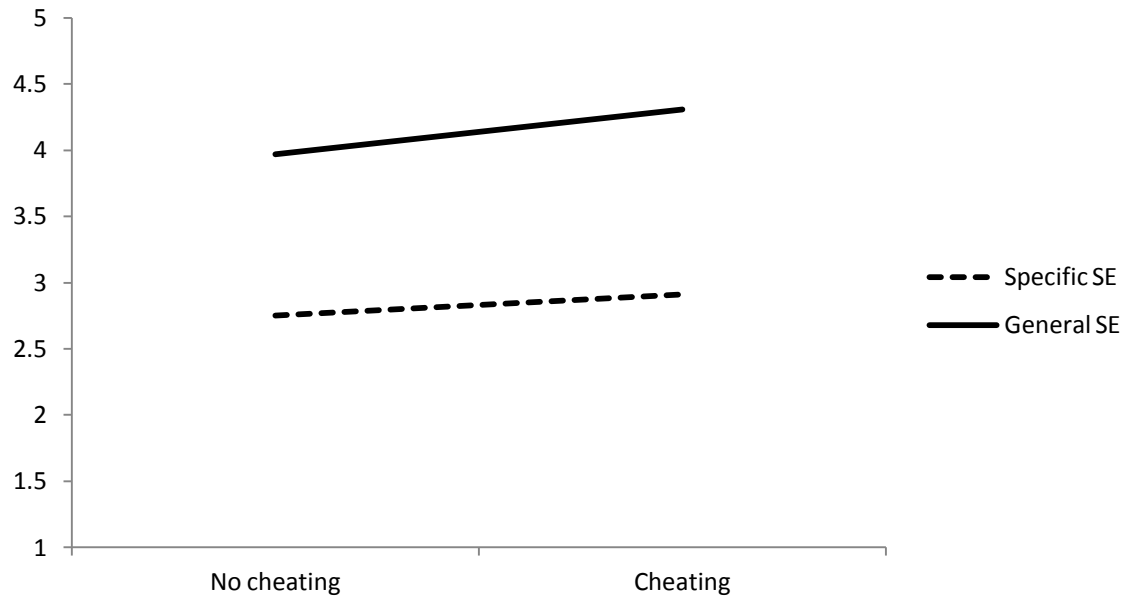| Self-efficacy type	No cheating		Cheating	
	M	SD	M	SD
Specific self-efficacy	16.50	2.67	17.43	3.47
General self-efficacy	31.73	4.12	34.49	3.78

Figure 1. Self-efficacy type and cheating

Hypotheses 3 and 4

H_3: *Participants who cheat and who take the cognitive test first will report higher specific self-efficacy than participants who cheated and who take the cognitive test second.*

H_4: *Participants who cheat and who take the cognitive test first will report equal levels of general self-efficacy to participants who cheated and who take the cognitive test second.*

In order to test H_3 and H_4, two univariate ANOVAs were conducted, using testing order and cheating behavior as the independent variables with SSE scores and GSE scores as the dependent variables. Table 4 shows the means and standard deviations, which are depicted in Figures 2 and 3. Table 5 shows the significant levels for each main effect and interactions.

H_3 was not supported, as the significant interaction between cheating behavior and testing order indicates that SSE is lowest, rather than highest, after a participant cheats, and highest before a participant cheats. For participants who do not cheat, SSE stays constant.

H$_4$ was supported, as the non-significant interaction between cheating behavior and

testing order indicates that GSE remains equivalent regardless of cheating behavior.

Table 4
Means, standard deviations, and significance levels for cheating and self-efficacy types

	S-E scales first		Cognitive test first	
	M	*SD*	*M*	*SD*
SSE				
No cheating	2.76	.54	2.75	.39
Cheating	3.19	.46	2.63	.55
GSE				
No cheating	4.13	.32	3.88	.59
Cheating	4.40	.48	4.23	.46

Table 5
F values and significance levels for main effects and interactions

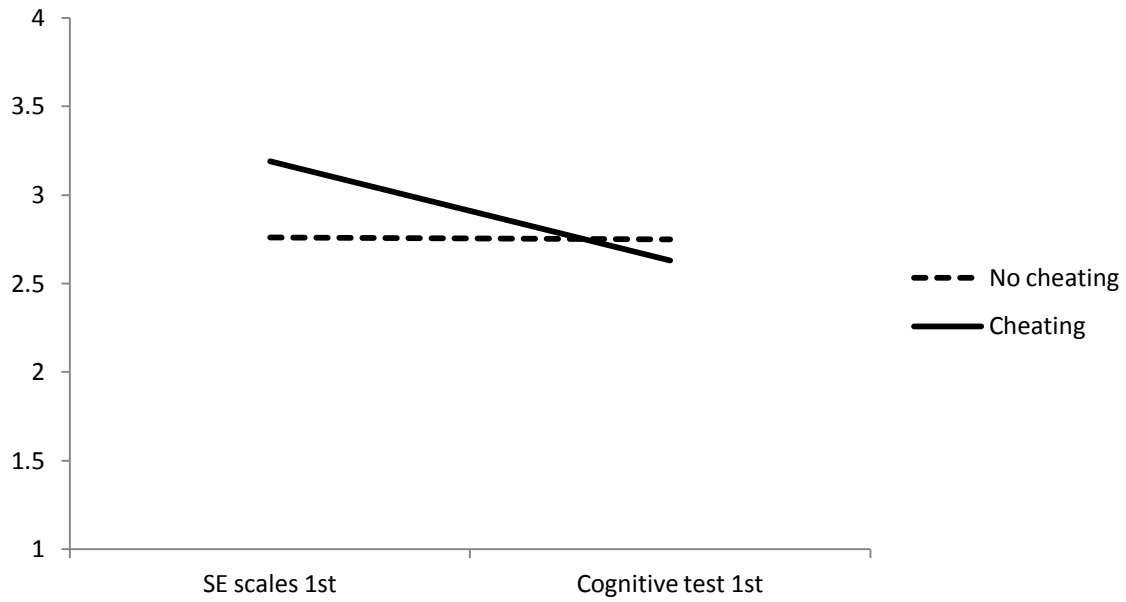|	*df*	*F*	*p*
SSE	63		
Cheating	1	1.76	.190
Testing order	1	5.56	.021
Cheating*Order	1	1.21	.027
GSE	63		
Cheating	1	6.52	.013
Testing order	1	2.87	.095
Cheating*Order	1	.12	.732

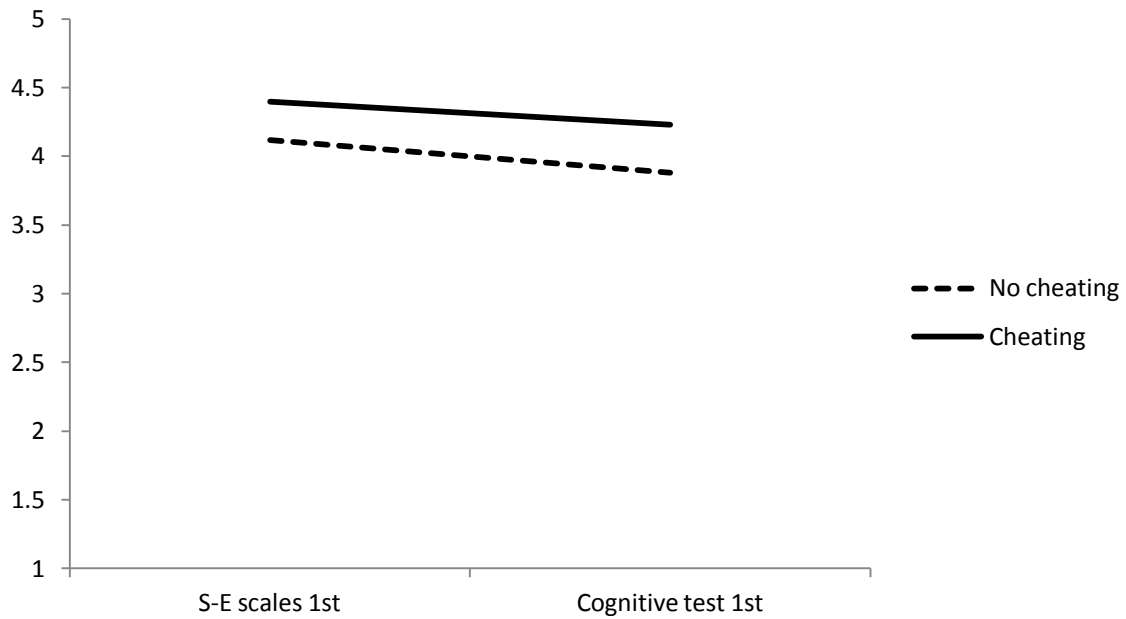Figure 2. Cheating and testing order for SSE.

Figure 3. Cheating and testing order for GSE.

Discussion

The proliferation of online selection testing has caused researchers to turn their attention to the possibility of cheating and the potential factors that can limit it. Past research has shown that high self-efficacy relates to less cheating in an academic setting (Chen et al., 2004). The current study helps to take the next step in applying self-efficacy research to employee selection by implementing an unproctored Internet test with a fiscal benefit contingent upon test performance. This study attempts to determine the relationship between an individual's sense of self-efficacy and cheating—the use of external resources—in unproctored selection testing. It was hypothesized that high levels of both general self-efficacy (GSE) and specific self-efficacy (SSE) predict lower rates of cheating overall.

Additionally, the study seeks to find if the post-cheating self-deception evident in Chance et al.'s (2011) experiment can be extended to the test-taker's sense of self-efficacy. Chance et al. found that students who gained artificially high scores on a test through cheating will afterward predict that they will receive similarly high scores on future tests. Self-deception in this case implies that individuals attribute successful performance to their natural ability, even when their success clearly came from external conditions. We hypothesized that the same attribution informs individuals' senses of self-efficacy, such that self-efficacy increases immediately after indulging in cheating behavior. Specifically, SSE increases while GSE remains constant, for the reason that SSE commonly fluctuates based on successes and failures during daily events, while GSE is considered a more stable trait (Chen et al., 2001).

First, contrary to my hypothesis, SSE—in this study, mathematics self-efficacy—did not predict cheating behaviors. One possible explanation for the lack of predictive power of SSE is that the competencies assessed in the mathematics SE scale do not adequately match those called

for in the online mathematics test. The scale primarily asks participants to rate their confidence in figuring out how to solve general classes of math problems, meaning that the skills inquired about are conceptual. The online test, however, consisted mostly of calculations—division, multiplication, and working with fractions. Essentially, the scale asked about planning while the online test measured execution. This discrepancy can be resolved in future studies by creating a new SSE measure that more closely aligns with the skills used on the online test.

GSE, on the other hand, did predict cheating behaviors, although in the opposite direction as hypothesized. The hypothesis followed the assumption that the successes in life that gradually builds an individual's GSE stem from performance abilities that are ethical in nature or reflective of high cognitive ability. However, being observant and opportunistic are also useful abilities to have and can easily result in using a calculator for an unproctored online math test. A series of studies by Richard Wiseman in his book *Quirkology* (2008) demonstrated that individuals naturally differed in their tendency to observe and take advantage of their surroundings. I can speculate that observant and opportunistic individuals are much more likely to use the calculator placed in the room during the math test. Additionally, the studies found that people with these abilities were on average more successful in their careers. It is entirely possible that these successes over time fostered a high sense of GSE. Future studies could greatly benefit from testing the connections between observance/opportunism and GSE, and ultimately linking both to cheating behaviors.

Self-deception appeared to affect self-efficacy levels following cheating behavior. After participants cheated on the mathematics test and performed artificially well, their SSE scores decreased while their GSE scores did not change. The alterations fit with past conceptions of self-efficacy, specifically in that SSE levels are prone to fluctuation following individual events

that allow people to perceive their performance ability, while GSE is less susceptible to change. The hypothesis introduced the suggestion that "fake" success—performing well as a result of cheating—influences SSE similarly to that of legitimate success. However, this was unsupported by the findings in the direction predicted. SSE decreased after cheating rather than increased. In explanation, it is possible that, unlike Chance et al.'s (2011) study in which students were overtly provided an answer key without the implication that they were not allowed to use it, participants in the current study were forced to come face-to-face with their inability to answer the test questions by using a calculator despite knowing that they should not. If true, the act of cheating by actively rejecting ethical norms can represent a performance failure in the mind of the participant, rather than a success as hypothesized.

Age also proved to be a significant predictor of cheating: older participants demonstrated lower rates of cheating than younger participants. Self-efficacy levels did not differ according to age, so the differing motivations to cheat must come from some unmeasured factor. Hartmann (2010) found that an individual's stage of morality effectively predicted cheating behavior on unproctored internet testing. As morality progression increases with age, morality may be acting as a mediator between age and cheating.

Limitations

As this study was a laboratory experiment, the artificial situation created could not fully match that of an actual applicant selection situation. The reward—the chance to win $100—was simply not powerful enough an incentive to accurately simulate the opportunity to receive a job offer. In fact, many participants' primary motivation might have been to simply complete the study for the research credits. For these participants, motivation to use the calculator may have

stemmed from the desire to complete the test as quickly as possible, rather than as accurately as possible.

The study sought to track changes in SE as a result of cheating. However, each participant completed the SE scales once, either before or after the online test. In order to fully expand this line of research, a series of SE scales should be administered to each participant over time—before the online test, immediately after the online test, and a period of time after the online test.

Another limitation of the study was the assumption that people with high self-efficacy prefer to engage in ethically sound behavior. It is easily possible for participants high in self-efficacy to feel confident in gaining a high score on the online math test without a calculator, yet still prefer to use a calculator for the purposes of conserving time and effort. Ideally, a future study would include a moral development measure for use as a moderator variable.

As mentioned earlier, the measurement of mathematics SE used could possibly have been another limitation. The measure used in this study originated from past research of mathematics SE, and may not have reflected the skills used by the online math test as precisely as possible. Future studies should call for the development of a new measure of mathematics SE that is appropriately calibrated for the specific math test used.

Future Directions for Research

The next step for this line of research is to investigate the relationships between self-efficacy and cheating in the field. While a field study would provide the clearest picture of how self-efficacy and cheating interact, several barriers make its implementation difficult. Technologically, there is no known way to measure cheating when the applicants are free to take the online test from their home computers. Also, the study may void the legitimacy of the

application process, creating some ethical concerns. One possible method of circumventing these barriers is to institute a multiple hurdles process for the online test. By proctoring a brief retest of the online test for the applicants who score highly, employers are able to compare the scores of the two tests and infer cheating based on psychometric properties (Tippins et al., 2006). While imperfect, this type of assessment can give researchers a clearer view of cheating behaviors as they pertain to unproctored selection testing.

The multiple hurdles process raises other speculations about the effects of self-efficacy. Job applicants faced with the prospect of a future retest may choose to cheat based on their confidence of performing well on the retest—or, ultimately, based on their sense of self-efficacy. Inversely to SE effects upon cheating on more straightforward testing methods, low SE, and not high SE, could potentially act as a deterrent for cheating behaviors. Applicants with low SE could be more likely to view the chance of being caught cheating as more probable, as they lack the confidence that high-SE applicants have in performing well on the proctored retest.

Finally, future research has the opportunity to examine the unpredictable relationship found between GSE and cheating behaviors. As speculated upon earlier, the implications of high levels of GSE correlating with high rates of cheating suggests that the composition of GSE differs from SSE to a greater degree than self-efficacy researchers have inferred. In particular, the motivations and abilities that specifically relate to GSE can help to reveal its relationship with cheating.

The surprising results of this study imply that several variables that interact with the relationships between self-efficacy and cheating. The roles of differing motivations, moral development, self-perceptions, and opportunism could each be an important factor that influences an individual's propensity to cheat. By further examining these paths of research,

unproctored Internet testing could eventually be made into a plausible—or at the very least a

fully understood—option for employee selection.

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Appendix A

Math Confidence Scale

	Very confident	**Confident**	**Not very confident**	**Not at all confident**
How confident do you feel about calculating how many square feet of tile you need to cover a floor?	☐	☐	☐	☐
How confident do you feel about calculating how much cheaper a TV would be after a 30% discount?	☐	☐	☐	☐
How confident do you feel about understanding graphs presented in newspapers?	☐	☐	☐	☐
How confident do you feel about calculating the gas mileage of a car?	☐	☐	☐	☐
How confident do you feel about using a train timetable to work out how long it would take to get from one place to another?	☐	☐	☐	☐
How confident do you feel about finding the actual distance between two places on a map with a 1:100 scale?	☐	☐	☐	☐

Appendix B

General Confidence Scale

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I will be able to achieve most of the goals that I have set for myself.	☐	☐	☐	☐	☐
When facing difficult tasks, I am certain that I will accomplish them.	☐	☐	☐	☐	☐
In general, I think that I can obtain outcomes that are important to me.	☐	☐	☐	☐	☐
I believe I can succeed at most any endeavor to which I set my mind.	☐	☐	☐	☐	☐
I will be able to successfully overcome many challenges.	☐	☐	☐	☐	☐
I am confident that I can perform effectively on many different tasks.	☐	☐	☐	☐	☐
Compared to other people, I can do most tasks very well.	☐	☐	☐	☐	☐
Even when things are tough, I can perform quite well.	☐	☐	☐	☐	☐