FAKING BAD:
DO HIGH-ABILITY ELEMENTARY STUDENTS INTENTIONALLY UNDERACHIEVE WHEN THEIR WORK IS PEER-REVIEWED?

A Dissertation in
School Psychology

by
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ABSTRACT

While faking bad, or the intentional distortion of assessment results, has been studied extensively with self-report measures (Lim & Butcher, 1996; Roskes, 2009), the possible presence of this behavior on direct measures has only just begun to be examined. Previous studies of faking bad on academic measures have been limited to students at the middle and high school levels, and results have indicated that students of high ability report faking-bad behavior more often than other students (Boehnke, 2008). These studies also have been limited by their use of nonexperimental designs. Thus, the current study examined faking-bad behavior on direct measures of reading and mathematics achievement in fourth and fifth grade. Students were randomly assigned to a treatment or control condition. In each condition, participants completed brief standardized measures of reading and mathematics. In the experimental condition, participants were informed that their peers would be grading their work after completion of the assessment. In the control condition, participants were informed that their teachers would be the ones to grade their tests. Results indicated that peer review did not adversely affect the reading or mathematics achievement of fourth and fifth grade high-ability students. Moreover, faking-bad behavior did not vary by gender for either subject area. Therefore, intentional underachievement does not appear to occur at the fourth and fifth grade levels in reading or math.
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DEDICATION

This research paper is lovingly dedicated to my mother, Joyce Kotz: an educator, wife, and mother, who will be eternally missed but whose short time on the earth left a positive fingerprint on countless people. She encouraged me as a young child to follow my dreams and helped me to believe that anything can be possible if you have the courage to pursue it.
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CHAPTER I:
LITERATURE REVIEW

Every day people make decisions regarding how to present themselves based on their self-presentational goals. In turn, goals for self-presentation, also known as a form of impression management, influence a large range of social decisions and judgments (Vohs, Baumeister, & Ciarocco, 2005). In fact, some researchers have argued that self-presentation shapes all aspects of human behavior and has important implications for how individuals are perceived, evaluated, and treated by others (Martin, Leary, & Rejeski, 2000). Common examples of self-presentation or impression management include appearing conservative in a job atmosphere, neglecting to disclose bad habits while on a date, and pretending to be more skilled in a specific area or trade during a job interview. While some people may strive to appear more competent in an area, others may downplay their abilities in an effort to be more socially accepted, as desirable qualities differ according to context (Schlenker, 1980).

Although the use of self-presentation to shape others’ impressions of oneself has been extensively studied with job applicants, professionals, and users of social networking sites such as Facebook, MySpace, and StudiVZ (Barrick, Shaffer, & DeGrassi, 2009; Hewlin, 2009; Kramer & Winter, 2008), the application to educational settings has not been explored thoroughly to date. Given the high prevalence of impression management and self-presentation behaviors in employment, it is plausible that such behaviors would also be observed in school settings. However, while a primary goal of adulthood is to attain a certain occupational status, a central goal of adolescence is to achieve and maintain peer approval (Brown, 1990). Thus, the self-presentation goals of
adults are likely in stark contrast to those of young students, as adults seek to present
themselves as intellectually competent in most settings, while children and adolescents
focus on emphasizing sociability and other values of young people.

One group of students potentially prone to the use of self-presentation strategies
includes students of high ability, who are frequently labeled nerds, brains, or geeks by
classmates (Huryn, 1986; Kinney, 1993; Seligman, 1990). In order to avoid such
rejection, high-ability students attempt a variety of different impression management
techniques in an effort to remove the focus from their academic abilities. Accordingly,
Filkins (1995) suggested that minimization of academic abilities and underachievement
are the most commonly used self-presentation strategies of high-ability adolescent
students in response to peer pressure.

Given the prevalence of self-handicapping impression management strategies in
high-ability students, it is important that researchers and practitioners understand the
circumstances under which such behavior is exhibited. While this phenomenon has been
investigated at the upper grade levels (Filkins, 1995; Juvonen & Murdock, 1993; Moore,
1997), “faking bad” on measures of academic achievement has yet to be examined at the
elementary level. Furthermore, previous studies have not directly examined faking-bad
behavior through the use of an experimental design. Thus, the present study directly
examined whether young students engage in the self-presentation strategy of
underachievement under peer-review conditions.

**Impression Management**

The study of impression management and self-presentation was spurred by the
work of two early symbolic interactionists, Cooley (1902) and Mead (1934), who held
that people continuously imagine themselves in the role of others, anticipate reactions to their behaviors, and select their own behavior accordingly. Goffman (1959, 1971) expanded these theories with analyses of social behavior in which he found that people can be viewed as actors, and their interpersonal conduct can be considered performances. Thus, until the 1980s, social psychologists regarded impression management as a nonessential, tangential topic, which either confounded research processes or was considered to be an applied concept in politics, business, and advertising. However, extensive research in the 1980s and early 1990s (e.g., Jones & Pittman, 1982; Leary & Kowalski, 1990; Schenkler, 1980; Tedeschi, 1981) contributed to a shift in thinking about self-presentation from a topic of curiosity to a fundamental interpersonal process in which participants actively attempt to define their identities, roles, and interactions.

As a result of this shift, it was determined that people present images, or schemas, of themselves in order to control how they are defined and treated by others (Schlenker, 1980). The identities formed from these images are determined by self-glorifying motives, being consistent with self-beliefs, or because they are accurate. Such motives can be strengthened or weakened according to the condition and social context. As asserted by Schlenker and Weigold (1992, p. 137), “just as a textbook writer must edit information to present it in a readable, concise fashion, so must people edit information about themselves in everyday life to provide the ‘best’ descriptions possible.” Therefore, it is typically in one’s best interest to convey specific types of impressions in the presence of others, and the employed type of impression is dependent on the context and what the person is trying to achieve (Jones & Pittman, 1982). For example, Lievens, Klehe, and Libbrecht (2011) identified a significant difference in self-reported emotional intelligence
of job applicants versus employees, as job applicants have a vested interest in trying to appear more emotionally intelligent while current employees who already have the position are less inclined to exaggerate their traits.

Investigation of this process of impression management has revealed that multiple self-presentation strategies are available based upon the achievement goal (Jones & Pittman, 1982). Specifically, when the context for impression management regarded academic achievement, two opposing strategies were commonly used: self-promotion and self-deprecation. Examples of the former strategy include statements describing positive performance on a specific subject or task, while examples of the latter include statements describing how an individual performs a specific subject or task poorly.

Additional recent literature in the field of social psychology has examined how people interpret others’ self-attributional statements. While some researchers argue that behaviors are perceived to be directly representative of a person’s personality (also known as trait inference; Gilbert & Malone, 1995; Uleman, Newman, & Moskowitz, 1996), others assert that because people are aware of self-presentational motives, these statements can be interpreted as either directly representative of an individual’s personality or indicative of how that person would like to be perceived (Hilton, Fein, & Miller, 1993; Vonk, 1993). Through the examination of how impression management guides the perceptions of student achievement, Vonk (1999) found that the presence of a verification indicator (i.e., a direct measure of someone’s claim, such as a score on a test) moderated the relationship between the type of statement and how it is perceived. From such findings, it was determined that students making low-ability statements are perceived to be driven by impression management, or self-deprecation, when verification
is possible. Conversely, students who make high-ability statements are perceived as engaging in self-promotion only when verification is not possible. In sum, students not only engage in self-promotion and self-deprecation strategies but also apply the knowledge of the aforementioned methods to academic achievement statements made by fellow students. Specific studies that explore the relationship between impression management and achievement are outlined in Table 1.
### Table 1

**Studies that Explore the Relationship Between Self-Presentation and Achievement**

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<tr>
<th>Citation</th>
<th>Sample</th>
<th>Measure</th>
<th>Conclusion</th>
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<tbody>
<tr>
<td>Barcocas &amp; Christiansen, 1968</td>
<td>College students</td>
<td>Self-report scale, interest bank, &amp; GPA</td>
<td>Students who are good impression managers achieve higher GPAs than poor impression managers.</td>
</tr>
<tr>
<td>Boehnke, 2008</td>
<td>14-year-old 8th &amp; 9th graders</td>
<td>Self-report, report card grades, &amp; performance on 3 math items</td>
<td>Peer pressure experienced by high-ability students results in lower achievement, while similar findings were not observed for students with low or medium abilities.</td>
</tr>
<tr>
<td>Brown, Uebelacker, &amp; Heatherington, 1998</td>
<td>College students</td>
<td>Verbal report of GPA predictions</td>
<td>Self-reported predictions of achievement for males differed according to the personality of the peer, while self-reports did not vary for females.</td>
</tr>
<tr>
<td>Filkins, 1995</td>
<td>7th, 8th, 10th, &amp; 11th graders</td>
<td>Self-report rating scale</td>
<td>High achieving students are likely to engage in minimization or underachievement in response to peer pressure.</td>
</tr>
<tr>
<td>Fitzpatrick, 1978</td>
<td>2nd – 10th graders</td>
<td>GPAs</td>
<td>High-ability students who ultimately earn GPAs that fall below the class mean begin to underachieve in Grade 6.</td>
</tr>
<tr>
<td>Ford, Granthem, &amp; Whiting, 2008</td>
<td>5th – 12th graders</td>
<td>Self-report of achievement related attitudes &amp; behaviors</td>
<td>In an effort to refrain from betraying peers by “acting White,” Black students frequently engage in purposeful underachievement.</td>
</tr>
<tr>
<td>Fordham &amp; Ogbu, 1986</td>
<td>Middle school students</td>
<td>Self-report measures</td>
<td>Adolescent students often engage in underachievement in an effort to escape ridicule from peers.</td>
</tr>
<tr>
<td>Forsyth, Schlenker, Leary, &amp; McCown, 1985</td>
<td>College students</td>
<td>Self-report questionnaire of personality</td>
<td>Male college students emphasize their academic achievement when given a leadership role within the classroom, while female college students emphasize socio-emotional and interpersonal skills.</td>
</tr>
<tr>
<td>Heatherington, et al., 1993</td>
<td>College students</td>
<td>Student predictions of GPA</td>
<td>Female college students report lower GPA predictions as compared to men when interacting with low achieving partners.</td>
</tr>
<tr>
<td>Heatherington, Townsend, &amp; Burroughs, 2001</td>
<td>College students</td>
<td>Student predictions of GPA</td>
<td>Men tend to overpredict their achievement, while females offer accurate predictions.</td>
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Table 1

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<tr>
<th>Citation</th>
<th>Sample</th>
<th>Measure</th>
<th>Conclusion</th>
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<tbody>
<tr>
<td>Henagan &amp; Bedaian, 2009</td>
<td>Adults</td>
<td>Self-report surveys</td>
<td>Because high-ability students experience discomfort when peers respond negatively to their achievements, they engage in modest self-presentation, avoidance, or underachievement.</td>
</tr>
<tr>
<td>Henfield, Moore, &amp; Wood, 2008</td>
<td>7th, 8th, &amp; 9th graders</td>
<td>Demographic surveys &amp; one-on-one interviews</td>
<td>Environmental variables have resulted in a high occurrence of underachievement in high-ability Black students.</td>
</tr>
<tr>
<td>Hudgins, 2008</td>
<td>Adults</td>
<td>Qualitative observations &amp; conversations</td>
<td>When faced with peer pressure, females earn lower scores on measures of mathematic achievement than males.</td>
</tr>
<tr>
<td>Juvonen &amp; Murdock, 1993</td>
<td>8th graders</td>
<td>Self-report ratings</td>
<td>Students report that high-ability and increased effort result in increased teacher liking and decreased peer popularity.</td>
</tr>
<tr>
<td>Tyson, Darrity, &amp; Castellino, 2005</td>
<td>Middle &amp; high school students</td>
<td>Self-report surveys</td>
<td>While peer pressure negatively effects the achievement of African American students, similar effects are also observed on students of other cultural backgrounds.</td>
</tr>
<tr>
<td>Vonk, 1999</td>
<td>Adults</td>
<td>Ratings of personality traits</td>
<td>The presence of an indicator (e. g., score on a test) moderates the relationship between the type of statement and how it is perceived.</td>
</tr>
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</table>
Impression Motivation and Construction

As a result of the interplay between impression management and peer knowledge of such strategies, a two-component model has been developed to explain the process by which people attempt to control the impressions of others (Leary & Kowalski, 1990). The first discrete component involves impression motivation, or the extent to which people are motivated to manage their public impressions. Underlying this component are the goal-relevance of the impressions, value of desired goals, and discrepancy between the desired and current image. The second component of the impression motivation model describes impression construction, or the process by which the person goes about making the desired impression. This component involves several facets, including self-concept, role constraints, and current or potential social image. As such, this model provides a framework for understanding the processes contributing to impression-relevant behavior.

Taking this model into account, Filkins (1995) applied both components of impression motivation and impression construction to high-ability students, resulting in four categories of academic self-presentation styles employed in an attempt to maintain peer approval. One category was group isolation, or having students refuse to follow social norms of peers who denigrate high achievement. Another category was acceptance, in which students accept what is viewed as a negative trait (e.g., high achievement) and the associated effect this may have on peer approval. A third category was minimization, where high achieving students attempt to downplay their academic abilities in order to maintain peer approval. Students who engage in this behavior recognize the importance of academic achievement, but they do not want to incur any associated peer rejection. Thus, they engage in behavior that makes their effort and
achievement less noticeable. Finally, high-ability students also engage in
underachievement, or pretending not to know as much as they do. In contrast to students
who engage in minimization, underachievers refuse to engage in behavior associated with
positive achievement. As a result, these students are prone to experience academic
mediocrity and possibly failure. Filkins’ (1995) study of high-ability seventh and eighth
graders revealed that, of the four aforementioned strategies, minimization and
underachievement are reported by students to be the most prevalent self-presentation
styles.

Underachievement

According to researchers (e.g., Colangelo, Kerr, Christiansen, & Maxey, 1993;
Emerick, 1992; Richert, 1991; Rimm, 1995), a broad definition of underachievement is a
discrepancy between children’s abilities and their school performance. A frequently
investigated topic, Dai, Swanson, and Cheng (2011) found that
achievement/underachievement is one of only four main topics on which focus is placed
in empirical studies concerning high-ability students. To describe the possible origins of
underachievement for students, Rimm (2008) created a 2 x 2 matrix that plotted effort
(from negative to positive) against outcomes (from negative to positive). Though four
categories exist within this framework, only positive effort resulting in positive outcomes
would produce appropriate levels of achievement.

Through the examination of underachievement, several explanatory hypotheses
have been proposed and tested in an effort to better understand potential causes of
underachievement. For example, Heyman and Legare (2005) examined the value of
different sources of information (e.g., self-report, teacher report, peer report, direct
observation) regarding psychological traits, including ‘smart’ and ‘honest.’ Results indicated that social desirability plays a significant role within the self-presentational process, yielding difficulties with the interpretation of self-report of achievement among children. Case study research also has shown the significance of social variables on the intentional underachievement of high-ability students (Moore, 1997).

**Grade Level**

Although the majority of studies on impression management have been conducted on college students or adults in the professional world (e.g., Barrick, Shaffer, & DeGrassi, 2009; Brandt, Vonk, & Knippenberg, 2009; Carter & Sanna, 2008; Chen, Wu, Kee, Lin, & Shui, 2009; Henagan & Bedeian, 2009; Hewlin, 2009; Lalwani & Shavitt, 2009; Schlenker & Goldman, 1982), some researchers have begun to examine these phenomena in middle and high school settings. For example, Shen, Sullivan, Igoe, and Shen (1996) asked seventh graders and high school students to read scenarios in which the main character attempted both easy and challenging tasks. After completing the readings, the students were asked to predict whether the main character would attempt the same task a second time. Students also were asked if they would reattempt the same easy and difficult tasks as the main character. Self-presentation strategies were evident for all of the students as a higher return-to-task rate was reported for easy tasks for the scenario characters, while a significantly higher return-to-task rate was self-reported by the students for challenging tasks. Therefore, the authors concluded that self-presentation strategies are employed by children in high school and seventh grade.

Juvonen and Murdock (1993) examined the use of self-presentation strategies by students at the upper intermediate level. In this study, eighth graders were found to report
differential consequences of ability and effort according to the type of audience member. The results revealed that students predicted high ability and high effort would result in increased teacher liking but decreased peer popularity. A follow-up study with the same eighth grade participants examined the self-attributions for successful and poor performance. Findings uncovered that when explaining their exam performance to peers, they were less likely to attribute the outcome to ability compared to when they communicated with parents or teachers. In addition, students did not attribute success to effort when interacting with peers, while effort was offered as a reason for success when talking with parents and teachers. Thus, some adolescents attempted to mask their achievement efforts and give the appearance of not expending effort (Fordham & Ogbu, 1986).

In trying to determine when children begin to associate effort with negative social consequences, Rimm (2005) found that 15% of children in the third grade are worried about popularity, and the percentage of students concerned about this issue increases steadily with each grade in school. Furthermore, Yoshida, Kojo, and Kaku (1982) found that students begin recognizing that self-deprecating, or modest, personalities regarding achievement result in more peer approval as early as the second grade. Similarly, some researchers have begun to explore the point at which underachievement begins. Fitzpatrick (1978) examined the comparison between the cognitive ability of students with high ability and their achievement as defined by grade point averages (GPAs) from Grade 2 to Grade 10. The findings indicated a significant level of underachievement beginning in Grade 6 and continuing through Grade 10. Results of a similar study suggested that underachievement begins in Grade 3 (Shaw & McCuen, 1960). However,
the effect of social pressure on the presence of underachievement and the point at which its influence becomes significant were not directly examined by the aforementioned researchers.

By applying these findings to the research indicating the elevated prevalence of underachievement in high-ability students (e.g., Colangelo, Kerr, Christiansen, & Maxey, 1993; Preckel, Holling, & Vock, 2006; Wentzel & Asher, 1995), some researchers have begun to explore a possible causal relationship between the impression management of young students and underachievement. Boehnke (2008) found that the performance of high-ability middle school students is reported to be negatively affected by peer pressure, and such students may purposely underachieve to avoid social exclusion. Relatedly, students in seventh, eighth, tenth, and eleventh grade were also found to report engaging in faking-bad behavior on measures of achievement in an effort to cope with social pressures (Filkins, 1995). Given that social pressure and underachievement have been documented as early as second and third grade (Kinney, 1993; Rimm, 2005; Shaw & McCuen, 1960; Yoshida, Kojo, & Kaku, 1982), an examination of intentional underachievement at the elementary level appears warranted.

**Effects of Social Variables**

According to social comparison processes theory (Festinger, 1954), people possess an inherent inclination to evaluate their performance through comparisons with that of others. Although there have been many proposed revisions to this theory since its publication, research has consistently demonstrated that individuals seek such evaluations for the purpose of self-appraisal, self-enhancement, and self-improvement (Gibbons & Buunk, 1999). When applying such evaluative feedback to one’s own performance,
upward comparisons result in negative emotions, such as resentment, bitterness, edginess, and envy (Kruglanski & Mayseless, 1990; Schaubroeck & Lam, 2004). Due to these negative emotions, people react by strategically differentiating themselves or psychologically distancing themselves from the comparison group (Mussweiler, Gabriel, & Bodenhausen, 2000; Tesser, 1980). Therefore, although high achievers may feel proud of their accomplishments, they are also likely to experience discomfort resulting from how others may be responding to such achievements. According to Henagan and Bedeian (2009), such discomfort combined with comparison threat yields one of three possible results: modest self-presentation, avoidance behaviors, or socially motivated underachievement.

Applying these findings to the field of education, Brown (1990) hypothesized that resentment from typical students is created as a result of the unattainable achievement standards set by high-ability students, which may make the typical students look bad in the eyes of teachers and other adults. To test this prediction, Juvonen and Murdock (1993) asked college students as well as eighth graders to predict how success and failure would affect peer popularity and teacher liking. Results indicated differential effects of high achievement on their popularity with peers and teachers. Specifically, while the students predicted teachers would prefer students who were successful due to effort and ability, the respondents also predicted that these same students would be the least popular among their peers. This phenomenon resulted in increased motivation for high-ability students to underachieve in front of their peers.

As a result of studies such as these, Boehnke (2008) hypothesized that social variables contribute significantly to scholastic underachievement, or faking bad. To test
this hypothesis, Boehnke studied 1,694 middle-school students from three different countries. Findings indicated that adolescent students commonly experience peer pressure in mathematics classes, and this peer pressure leads to self-reports of lower achievement. Fears of social exclusion were found to be moderators in the determination of academic performance. A negative relationship between ability and performance was noted for students with very high mathematical skills, but this relationship was not evident, however, for students with low to average abilities.

Given the fact that African American students, including those identified as gifted, frequently exhibit underachievement or achieve at low levels due to a variety of environmental variables (Henfield, Moore, & Wood, 2008), much attention has been focused on African American students to better understand the impact of social factors on the achievement of high-ability African American youth. More specifically, researchers have found that Black students report experiencing societal pressure to ‘act White,’ which is defined as getting good grades, being intelligent, and speaking standard English (Fryer & Torelli, 2005; Ogbu, 2004). However, peer pressure counteracts this societal pressure in that ‘acting White’ is often viewed as a betrayal by peers, which results in Black students intentionally underachieving (Ford, Granthem, & Whiting, 2008). Tyson, Darry, and Castellino (2005), though, concluded that the negative effects of peer pressure on academic achievement for high-ability youths transcends cultural boundaries and exists for students of all ethnic backgrounds. While the aforementioned studies shed light on the prevalence of faking bad in students, they have focused primarily on middle school and high school students without examining if this effect is present at an even younger age.
Effect of Ability Level

Underachievement, as an educational outcome for students of high ability, has sparked several controversies over the past 30 years (Anastasi, 1976; Behrens & Vernon, 1978; Rimm, 1986). Researchers disagree about the presence of underachievement in high-ability populations, suggesting that low performance among high-ability students can be attributed to measurement error. Despite such arguments, many practitioners agree that underachievement of high-ability students is a persistent problem within schools (Colangelo, Kerr, Christensen, & Maxey, 1993; Rimm, 2008). In 1983, the National Commission on Excellence in Education (NCEE) asserted that more than 50% of American students identified as mentally gifted do not achieve academically at their potential. However, minimal explanation was offered regarding how the commission arrived at this conclusion or possible reasons for this phenomenon. Since the release of the NCEE report, several researchers have explored underachievement and attempted to explain its occurrence in high-ability populations.

Niehart (2006) indicated that internal conflicts within gifted students arise when these children begin to associate certain achievement attitudes or behaviors with betrayal of their social culture. An extension of this theory was tested among gifted middle and high school boys who were asked to complete two self-report measures, namely the Male Role Norms Inventory – Adolescent and the Behavior Assessment System for Children – Self-Report of Personality (Shepard, Nicpon, Haley, Lind, & Liu, 2011). However, results indicated a negative correlation between achievement and social stress. That said, the authors noted that their sample of adolescent boys was comprised of students who
opted to attend a specialized summer program and might not have been representative of all high-ability students, especially those participating in schooling with less-able peers.

**Effect of Gender**

The study of impression management differences between males and females has revealed several significant distinctions. In general, men tend to overestimate their performance in front of others, while women offer accurate estimates or underestimates of their performance (Daubman, Heathering, & Ahn, 1992; Roberts, 1991). In fact, Heatherington et al. (1993) found that when interacting with low-achieving partners, female college students offer lower predictions of their GPA as compared to men, after controlling for actual level of achievement. The authors suggest that men, therefore, are more likely to display an attitude of immodesty than women. Relatedly, it has been found that women offer more accurate predictions of achievement, as males tend to inflate their achievement (Heatherington, Townsend, & Burroughs, 2001). Furthermore, when students in their first year of college were informed that they would be discussing academic achievement with a peer, the accuracy of the information offered by males and females differed significantly (Brown, Uebelacker, & Heatherington, 1998). To examine this phenomenon, each student was asked to describe his or her own achievement and make predictions regarding his or her first-semester GPAs. For males, the predictions and achievement discussions varied according to the personality of the peers, as males offered predictions that were higher than their actual GPAs when the peer was boastful, and they offered predictions that were lower than their actual GPAs when the peer was self-deprecating. The achievement information discussed by females, in contrast, did not vary, despite the differing personalities of the peers.
To better understand the factors by which males and females base their own achievement predictions, Forsyth, Schlenker, Leary, and McCown (1985) examined gender differences on a college leadership activity. Four-person, same-sex groups were created in which the students were asked to complete an assignment with knowledge that their group dynamics would be examined. Following a bogus inventory, on which everyone received the same ability and interpersonal scores, all participants were individually informed that they were their group’s leader due to their score tabulations. They also were told that they should guide the students during the task and would be asked to share information about their abilities and skills. Findings revealed that males emphasize abilities in their self-presentations, while females focus on socio-emotional and interpersonal skills. Thus, a clear gender effect was present for adult students when presenting themselves to peers.

While the presentation of overall achievement appears to be more inflated for men than for women, the actual achievement of students also appears to be affected by gender differences. Specifically, Hudgins (2008) observed that, in response to peer pressure, female adults experienced larger negative effects on mathematics achievement than males. Potential reasons for this include a history of male domination, associated psychological obstacles, and differential peer pressure experienced during adolescence. Relatedly, Boehnke (2008) observed similar results with school-age children, as middle school girls reported engaging in underachievement more often than boys on measures of mathematics in response to peer pressure, although the effect size was minimal. Such pressure may be felt even earlier, as girls begin to display an implicit affinity to language as opposed to math by 9 years of age (Steffens, Jelenec, & Noack, 2010). In contrast,
Filkins (1995) found that male middle school students engaged in a self-presentation style of underachievement more often than females according to overall GPAs. Therefore, while gender appears to play a significant role in the self-presentation of achievement, its effects on young students are less clear at this time.

**Subject Area**

Previous studies of self-presentation and impression management have focused largely on overall levels of achievement, as opposed to specific subject areas (e.g., Adler, Kless, & Adler, 1992; Barcocus & Christiansen, 1968; Brown, Uebelacker, & Heatherington, 1998; Colangelo, Kerr, Christiansen, & Maxey, 1993; Filkins, 1995; Forsyth, Schlenker, Leary, & McCown, 1985). For example, Barcocus and Christiansen (1968) asked undergraduate students to complete a familiar inventory in a manner such that they would appear as various types of professionals (e.g., Forest Ranger, Mortician). The results were used to divide the participants into two groups: those whose ratings reflected that of the specified professional (Good Impression Managers) and those whose ratings were significantly different from that of the specified professional (Poor Impression Managers). The overall GPAs of the two groups were compared to reveal that good impression managers achieved higher GPAs than those students who were not capable of effectively manipulating their appearance. However, this study did not examine differences according to reading performance or math achievement; rather, an average of all subject areas was employed as the outcome variable.

Similarly, overall achievement also was considered in a study of more than 30,000 high school juniors and seniors who performed at the 95th percentile and above on the American College Testing program (ACT). By comparing the high school GPAs of
these students, a high achieving group and an underachieving group were identified. An examination of demographic, attitudinal, and extracurricular differences revealed that 90% of the underachievers were Caucasian males, and the underachievers had fewer out-of-class accomplishments. Again, overall achievement levels were used to create such groups; therefore, it is unclear if underachievement is more prevalent in a specific subject area.

Conversely, other studies of students’ impression management have focused more narrowly on specific subject areas. In particular, studies of mathematics and problem-solving performance have revealed that self-presentation is reported by students as playing a significant role for students of high ability (Filkins, 1995; Hudgins, 2008). The role of self-presentation and the prevalence of faking bad on reading achievement, however, has not been tested. Thus, it is unclear if the findings replicate across specific subject areas.

**Rationale, Research Questions, and Hypotheses**

The purpose of this study was to directly examine the effects of peer pressure on the academic achievement of elementary students. In order to fully understand this phenomenon, specific skill areas and the possible effect of gender were both examined. Previous researchers have neither investigated faking-bad behavior with elementary-age students nor used an experimental design with direct measures of achievement. The possible phenomenon of intentional underachievement can be directly examined in different ways. One such way is prevalence, or the proportion of students engaging in the behavior while under peer review. The second method is magnitude, or the degree to
which students underachieve in response to peer-review conditions. Therefore, the following hypotheses were tested as part of this study.

**Hypothesis 1a.** High-ability students intentionally underachieve, or “fake bad,” on assessments of reading when they believe their responses will be reviewed by peers. Previous studies of middle and high school students have suggested that children with high levels of ability respond to peer pressure by reducing their effort and underachieving (Boehnke, 2008; Filkins, 1995; Fordham & Ogbu, 1986; Hudgins, 2008); however, these studies have not directly examined the outcome of achievement within an experimental design. Therefore, the present study incorporated an experimental group exposed to peer influence and a control group, and the effects of achievement were measured as opposed to the use of self-report. It was hypothesized that the results of previous studies will be replicated with younger children in the present experimental study. Additionally, while much of the literature has specifically examined the presence of faking bad on global measures of achievement (Barcotas & Christiansen, 1968; Brown, Uebelacker, & Heatherington, 1998; Colangelo, Kerr, Christiansen, & Maxey, 1993; Filkins, 1995; Forsyth, Schlenker, Leary, & McCown, 1985), such research has yet to examine the effects specific to reading measures.

**Hypothesis 1b.** Male students of high ability exhibit greater faking-bad behavior in reading as compared to female students of high ability. Although some previous research on achievement suggests that more females engage in faking-bad behavior (Hudgins, 2008), these studies have not exclusively assessed reading performance and only have examined adult women. Conversely, studies examining school-age children suggest that faking bad is more common for males (Filkins, 1995). Relatedly, impression
management research suggests that males are more inclined to portray inflated self-presentations to colleagues and peers (Daubman, Heathering, & Ahn, 1992; Forsyth, Schlenker, Leary, & McCown, 1985; Heatherington, Townsend, & Burroughs, 2001; Roberts, 1991; Brown, Uebelacker, & Heatherington, 1998). Accordingly, it was postulated that a greater proportion of high-ability males would exhibit faking-bad behavior as compared to females in the area of reading. It also was hypothesized that the magnitude of score differences would be larger for males when compared to females.

**Hypothesis 2a.** High ability students intentionally “fake bad” on assessments of mathematics when they believe their responses will be reviewed by peers. Although previous research has focused on adolescent populations, results have suggested that students opt to engage in purposeful underachievement in mathematics (Boehnke, 2008; Filkins, 1995; Hudgins, 2008). In addition to a lack of focus on elementary students, the aforementioned studies typically have featured indirect measures of mathematics skill and non-experimental designs. Thus, the present study included a sample of elementary-age students, direct measures of mathematics achievement, and an experimental design with a peer-review condition. Based on previous research, it was hypothesized that high-ability students would demonstrate greater prevalence and magnitude of underachievement when they believe their responses will be reviewed by peers.

**Hypothesis 2b.** Female students of high ability exhibit a greater faking-bad behavior in mathematics as compared to male students of high ability. Within the area of mathematics, previous research with adult participants has found that females experience larger negative effects on outcomes than their male counterparts (Hudgins, 2008). Similarly, Boehnke (2008) also observed that middle school girls reported engaging in
underachievement more often than boys on measures of mathematics. As such, it was postulated that more females would exhibit faking-bad behavior as compared to males in the area of mathematics. It was also hypothesized that the magnitude of score differences would be larger for females when compared to males in this subject area.
CHAPTER II:
METHODOLOGY

Participants

Participants included male and female students who attended elementary schools in a suburban district in eastern Pennsylvania. The final sample size was 723 students across seven elementary schools, with 393 students in fourth grade and 330 in fifth grade. Within the sample, 88.6% of students were Caucasian, 0.7% were African American, 0.4% were Hispanic, and 10.3% were Asian American. The sample consisted of 50.0% females and 50.0% males, and 53.6% of the sample participated in the experimental group, while 46.4% participated in the control group. Regarding ability level, 105 students were identified as having high cognitive ability (FSIQ > 120). This level of ability was chosen due to previous studies determining it to be the most accurate cut-off level for the identification of gifted students of elementary age (Lee & Karnes, 1983).

Participants were treated in accord with the ethical principles of the American Psychological Association (2002) and the guidelines of The Pennsylvania State University Office for Research Protections.

Measures

Cognitive Ability. To identify participants with high ability, general intellectual functioning was measured by the composite of the Cognitive Abilities Test, Form 6 (Lohman & Hagen, 2002). The Cognitive Abilities Test is a group-administered measure of intellectual ability that had been administered to all participants during their first grade school-year. Although short- and long-term reliability evidence for this measure has not yet been established for the most recent version, stability over short-term (less than 3
weeks) and long-term (3- and 6-year) intervals has been documented with the previous version of the measure (DiPerna, 2005). Moreover, internal consistency evidence is strong across the batteries and levels ($r = 0.90$). Structural validity was analyzed using confirmatory factor analysis, which provided support for a three first-order and single second-order factor model. Additionally, concurrent validity evidence has been examined with the scores on two achievement tests, including the Iowa Test of Basic Skills (Hoover, et al., 2005) and the Iowa Test of Educational Development (Forsyth, Ansley, Feldt, & Alnot, 2003).

**Pennsylvania System of School Assessment.** Prior academic achievement in the areas of reading and math was measured by the Pennsylvania System of School Assessment (PSSA). The PSSA includes standardized measures of achievement that are administered to all elementary students in Grades 3-5 attending schools in the state of Pennsylvania. Both continuous scores (ranging from X to Y) and categorical proficiency levels (below basic, basic, proficient, or advanced) are generated from the PSSA. In the current study, participants’ most recent PSSA scores were incorporated into the regression equation used to predict achievement on the reading comprehension and mathematics measures that were administered as part of the study. :

**Reading comprehension.** Reading comprehension was measured through the use of AIMSweb Maze-CBM (2009; Appendix A). Maze-CBM requires a child to silently read a grade-level appropriate passage. The first sentence of the passage is left intact; however, in subsequent sentences, every seventh word is replaced with three words inside parentheses, and students are asked to choose the best word to complete the sentence. Test-retest and parallel forms evidence for Grades 3-6 indicate Maze-CBM scores
demonstrate adequate reliability ($r = .82-.97$; Tindal, Marston, & Deno, 1983). Maze-CBM scores have demonstrated adequate criterion validity with the authentic and literature based Basal Readers ($r = .64-.67$; Hintze, Shapiro, Conte, & Basile, 1997), the Diagnostic Reading Scales ($r = .75-.76$; Lomax, 1983), and the Wheldall Testing of Reading Passages ($r = .71$; Madelaine & Wheldall, 1999). For the present study, probes developed for the beginning of the fourth grade school-year were used to ensure that the level of difficulty was appropriate. Cronbach’s alpha was adequate ($\alpha = .77$) for the data from the current study.

**Mathematics.** AIMSweb Mathematics Concepts and Applications (2009) probes were used to assess the mathematics skills of participants (Appendix B). This type of assessment includes mathematics probes based on expected computational and conceptual skills for each grade level. Foegen, Jiban, and Deno (2007) summarized the results of technical adequacy studies of Mathematics Concepts and Applications curriculum-based measures (CBM) conducted since 1989. Findings for Grades 4-6 revealed adequate internal consistency ($r = .97$), alternate form reliability ($r = .81 -.88$), and criterion validity with the CTBS-Total Math ($r = .71 -.80$). Additionally, Thurber, Shinn, and Smolkowski (2002) performed a confirmatory factor analysis on the results of math-CBM for fourth grade students. Results indicated that scores from math-CBM are a valid indicator of mathematics knowledge for elementary students. In the current study, mathematical probes created for the beginning of the fourth grade school-year were used to ensure that the students were familiar with the content. Cronbach’s alpha was adequate for the current sample ($\alpha = .73$).
**Procedures**

Permission to conduct the study was obtained at the district administrative level, and seven elementary school principals subsequently agreed to participate in the study. Fourth and fifth grade teachers in these buildings sent a description of the study and parental consent letters home with the students. Students whose parents provided written consent for their participation were included in the sample for the study. For all participants, most recent PSSA reading and math scores, CogAT scores, and eligibility for supplemental reading and math services were obtained from district records.

Participants were assessed within their regular education classrooms, which consisted of a heterogeneous mixture of low-ability, average-ability, and high-ability students. The classrooms were randomly assigned to either the control group or experimental group. The students in the control classrooms were administered a Maze-CBM and a math-CBM task. In these classrooms, the principal investigator provided participants with oral and written instructions (Appendix C). These instructions informed the students that the papers would be graded by the principal investigator. At the outset, the principal investigator read an assent statement to the students (and printed on their cover sheet). The students were then asked to check whether they agreed or disagreed to have their results reviewed as part of this study (assent agreement rate = 98.4%). Following the administration in the control group, the papers were collected by the principal investigator.

In the experimental group, participants were administered the same Maze-CBM and math-CBM tasks, but the instructions were different from the control condition (Appendix C). Specifically, the instructions informed the students that their papers would
be graded by a peer immediately following the assessment and prior to removal of their names from the papers. Such instructions were delivered orally and printed on the students’ worksheets. The assent statement was read to the students, as well as printed on their cover sheets. The students then were asked to check whether they agreed or disagreed to have their results reviewed as part of this study (assent agreement rate = 97.5%). Following the administration, the principal investigator collected the papers, stating that there was not enough time to perform the peer grading.¹

**Data Analyses**

**Data preparation.** A multi-step process was used to identify students who were “underachieving”. First, data from a random subsample of 100 students from the control condition was used to develop a regression equation to predict expected achievement. Specifically, simultaneous multiple regression was performed to determine the best-predicting equation for achievement from the contributing variables (Appendix D). Separate equations were estimated for each subject area. The general equations for predicted reading (R) achievement and math (M) achievement were as follows:

\[
\text{ACH}_R = B_1 + B_2(\text{PSS AREAD}) + B_3(\text{SUPPAREAD}) + B_4(\text{GRADE})
\]

\[
\text{ACH}_M = B_1 + B_2(\text{PSSAMATH}) + B_3(\text{SUPPMATH}) + B_4(\text{GRADE})
\]

¹Debriefing procedures were not conducted given such disclosure could have confounded subsequent data collection if participants shared this information with peers in other classrooms that were participating at a later date. This approach was approved by Penn State’s Office of Research Protections as the deception was minimal and posed negligible risk to participants.
The PSSAREAD and PSSAMATH variables are the results of the standardized Pennsylvania System of Statewide Assessment for both reading and mathematics, respectively. SUPPREAD indicates whether students received supplemental services to assist with their reading skills, such as Title I reading support or Response to Intervention reading services. SUPPMATH indicates whether students received supplemental services to assist with their math skills, such as small group math support or Response to Intervention math services. GRADE is either Grade 4 or Grade 5.

These regression equations were applied to the remainder of the sample to generate predicted reading and mathematics scores. Predicted scores then were compared against obtained scores to determine occurrence of underachievement. Underachievement initially was operationalized as obtained scores that fell 2.0 standard errors of prediction below predicted scores.

**Primary analyses.** In order to assess the prevalence of differences in reading and math achievement, logistic regression analyses were performed on the remaining sample excluding the aforementioned subsample to determine if underachievers could be distinguished from achievers based on ability (low/average, high) and/or condition (experimental, control). The independent variable of gender (male, female) was also added for each of the dependent measures of reading and math achievement. Differences in reading and math achievement were examined through analyses of variance (ANOVAs) of mean score differences between expected and observed scores within each subject area. Again, the independent variables included ability, condition, and gender. Evidence to support the presence of faking bad was expected in the form of statistically significant logistic regression coefficients and interaction effects \( p \leq .05 \). Because eight
different analyses were conducted on this sample of data, a Bonferroni correction was
applied resulting in an adjusted alpha of .00625. Calculation of \( \eta^2 \) effect sizes was
hypothesized to result in small to medium \((.01 \leq \eta^2 \leq .06)\) effects, according to Cohen’s
CHAPTER III:

RESULTS

Descriptives and Tests of Assumptions

For the outcome achievement measures of reading and math, linearity was tested by plotting the standardized residuals against predicted values and found to be randomly distributed around zero. Histograms and p-plots were inspected, revealing normal distribution of the residuals. Independence of errors was determined by inspecting scatter plots of each of the predictor variables against the residuals. Collinearity diagnostics indicated no cause for concern, as the tolerance statistics did not approach zero. For the reading outcome measure, there were no missing data; however, nine cases were identified as outliers with residuals greater than 3.0. Interestingly, each of these nine outliers was an overachiever (i.e., had performed better than predicted). As such, these nine cases were subsequently removed from the analyses. No cases had missing data. For the mathematics outcome measure, there were neither outliers nor cases with missing data.

Following case deletion and removal of the subsample used to generate the predictive equations, the control group totaled 235 students, which included 112 (47.7%) males and 123 (52.3%) females. Additionally, within the control group, 208 (88.5%) students were identified as having low or average ability levels, and 27 (11.5%) were considered to have high ability levels. The experimental group consisted of 388 students, which included 198 (51%) males and 190 (49%) females. Within the experimental group,

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2 Separate analyses were also run with the outliers included in the area of reading, but no meaningful differences were observed.
324 (83.5%) students fell within the low/average ability category, and 64 (16.5%) students fell within the high ability category.

Post hoc power analyses (Cohen, 1988, 1992; Faul, Erdfelder, Lang, & Buchner, 2007) indicated that the obtained sample size provided adequate power (.90) for main and interaction effects assuming a small effect size ($\eta^2 = .02$) and an alpha level of .00625 for each of the analyses. Means and standard deviations for all measures are reported in Table 2.

Table 2

*Means and Standard Deviations for Independent and Dependent Variables*

<table>
<thead>
<tr>
<th>Measure</th>
<th>$M$</th>
<th>$SD$</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Skew</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>CogAT</td>
<td>107.35</td>
<td>12.56</td>
<td>68</td>
<td>143</td>
<td>-0.30</td>
<td>0.07</td>
</tr>
<tr>
<td>Reading</td>
<td>19.26</td>
<td>7.23</td>
<td>1</td>
<td>47</td>
<td>0.64</td>
<td>1.61</td>
</tr>
<tr>
<td>Math</td>
<td>15.27</td>
<td>4.94</td>
<td>3</td>
<td>29</td>
<td>0.33</td>
<td>-0.19</td>
</tr>
</tbody>
</table>

**Identification of Underachievement**

As explained in the method, preliminary analyses were conducted using data from comparison subsample of control participants ($n = 100$) to develop the prediction equations for each outcome measure (Appendix D). Specifically, a simultaneous\(^3\)

\(^3\)Sequential regression also was executed for both dependent variables in an effort to determine if order of entry improved the prediction equation; however, this type of analysis yielded the same results as that for each of the simultaneous regression analyses.
multiple regression was performed with the reading achievement measure as the dependent variable and statewide standardized reading test score, supplemental reading services, and grade as predictor variables. Similarly, a second simultaneous multiple regression was performed between the mathematics achievement measure and the aforementioned independent variables. To determine the best-predicting equations, all possible combinations of the three independent variables (i.e., state test scores, supplemental services, and grade) were tested. For both outcome measures, the use of all three predictor variables accounted for the largest amount of variance and yielded the smallest amount of error. For reading, $F(3, 96) = 36.29, p < 0.01, R^2 = 0.53$. For mathematics, $F(3, 96) = 24.75, p < 0.01, R^2 = 0.44$.

**Primary Analyses – Reading**

In order to identify the presence of underachievement, the aforementioned regression equation was used to predict the expected score of each participant based on their most recent score on the state reading test, receipt of supplemental services, and grade level. As noted previously, underachievement initially was defined as scoring two standard errors of prediction below predicted achievement; however, this conservative criterion yielded a minimal number of “underachievers” in reading. Specifically, only five of the students in the sample (0.80%) met this criterion. As such, the threshold for underachievement was lowered to a moderately-conservative criterion (i.e., 1.5 standard errors of measurement below the predicted value) and again to a relaxed criteria (i.e., 1.0 standard error of measurement below the predicted value). Given that relaxing the underachievement criterion raises the probability that faking-bad is due to measurement error, these analyses were considered to be exploratory.
percentages of students who underachieved in reading under each of these criteria. Tables 4 and 5 display the means and standard deviations of the underachievement scores by expected achievement and underachievement and by the independent variables, respectively.

Table 3

Percentage of Underachievers by Category in the Area of Reading

<table>
<thead>
<tr>
<th></th>
<th>Low/Average Ability</th>
<th>High Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>2.0 SEM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>1.21</td>
<td>1.26</td>
</tr>
<tr>
<td>Control</td>
<td>0.00</td>
<td>0.91</td>
</tr>
<tr>
<td>1.5 SEM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>2.42</td>
<td>5.66</td>
</tr>
<tr>
<td>Control</td>
<td>3.06</td>
<td>5.45</td>
</tr>
<tr>
<td>1.0 SEM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>13.94</td>
<td>20.76</td>
</tr>
<tr>
<td>Control</td>
<td>17.35</td>
<td>12.73</td>
</tr>
</tbody>
</table>

Note. Percentages are based on cell n.

*Experimental n = 165, Control n = 98. bExperimental n = 159, Control n = 110. cExperimental n = 33, Control n = 14. dExperimental n = 31, Control n = 13.
Table 4

Reading Scores for Expected Achievers and Underachievers by SEM Criterion Level

<table>
<thead>
<tr>
<th></th>
<th>Expected Achievers</th>
<th></th>
<th>Underachievers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>2.0 SEM(^a)</td>
<td>19.50</td>
<td>6.83</td>
<td>12.40</td>
<td>5.55</td>
</tr>
<tr>
<td>1.5 SEM(^b)</td>
<td>19.68</td>
<td>6.86</td>
<td>14.15</td>
<td>3.51</td>
</tr>
<tr>
<td>1.0 SEM(^c)</td>
<td>20.22</td>
<td>7.01</td>
<td>15.41</td>
<td>3.96</td>
</tr>
</tbody>
</table>

\(^a\) Expected Achiever \(n = 618\), Underachievers \(n = 5\). \(^b\) Expected Achiever \(n = 597\), Underachievers \(n = 26\). \(^c\) Expected Achiever \(n = 523\), Underachievers \(n = 100\).

Table 5

Means and Standard Deviations of Reading Scores by Condition, Gender, and Ability

<table>
<thead>
<tr>
<th></th>
<th>Experimental</th>
<th></th>
<th>Control</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td></td>
<td>M (SD)</td>
<td></td>
</tr>
<tr>
<td>Male High Ability</td>
<td>23.61 (7.66)</td>
<td></td>
<td>25.50 (6.04)</td>
<td></td>
</tr>
<tr>
<td>Low/Average</td>
<td>19.73 (6.37)</td>
<td></td>
<td>19.97 (6.41)</td>
<td></td>
</tr>
<tr>
<td>Female High Ability</td>
<td>24.16 (7.73)</td>
<td></td>
<td>21.92 (9.79)</td>
<td></td>
</tr>
<tr>
<td>Low/Average</td>
<td>17.77 (6.13)</td>
<td></td>
<td>17.34 (6.38)</td>
<td></td>
</tr>
</tbody>
</table>

Prevalence. Hypotheses 1a and 1b were tested to determine whether high-ability students fake bad on reading assessments when they believe their responses will be reviewed by peers. A direct logistic regression analysis was performed on the presence or
absence of reading underachievement as the outcome. A test of the full model with all three independent variables of ability, condition, and gender against a constant-only model was not statistically significant, $\chi^2 (3, n = 623) = 2.65, p = 0.45$, Nagelkerke $R^2 = 0.05$. Lowering the criterion to the moderately-conservative, $\chi^2 (3, n = 623) = 2.55, p = 0.47$, Nagelkerke $R^2 = 0.01$, and relaxed, $\chi^2 (3, n = 623) = 3.14, p = 0.37$ Nagelkerke $R^2 = 0.01$, levels did not yield significant results. Therefore, the full model did not distinguish achievers in reading from those who underachieve.

**Magnitude.** To further explore Hypotheses 1a and 1b, a 2 x 2 x 2 between-subjects analysis of variance was performed on the dependent variable of the difference between observed reading performance and the expected reading performance. The three independent variables included condition (control and peer-review), ability level (high and low/average), and gender (male and female). The testing of Hypothesis 1a revealed no significant interaction between the two independent variables of ability and condition, $F(1, 615) = 0.06, p = 0.82, \eta^2 = 0.00$. Main effects were also non-significant for condition, $F(1, 615) = 0.16, p = 0.69, \eta^2 = 0.00$, and for ability level, $F(1, 615) = 0.92, p = 0.34, \eta^2 = 0.00$. Similarly, with respect to Hypothesis 1b regarding the effect of gender, the ANOVA indicated no significant interaction between the three independent variables, $F(1, 615) = 0.78, p = 0.38, \eta^2 = 0.00$. Relatedly, interaction effects were not present between gender and ability level, $F(1, 615) = 0.13, p = 0.72, \eta^2 = 0.00$, nor were they present between condition and gender, $F(1, 615) = 0.44, p = 0.83, \eta^2 = 0.00$. Finally, the main effect of gender was examined but found to be non-significant, $F(1, 615) = 0.00, p = 0.97, \eta^2 = 0.00$. 
Primary Analyses – Mathematics

Consistent with the procedures used in the reading domain, math underachievement initially was defined as scoring two standard errors of measurement below the predicted value. Again, however, this conservative criterion yielded only a minimal number of underachieving students. Specifically, 5 students (0.80%) met this criterion in math. As a result, the stringent criterion was relaxed in which the threshold for underachievement was lowered to a moderately-conservative level (1.5 standard errors of measurement below the predicted value) and again to a relaxed level (1.0 standard error of measurement below the predicted value). Table 6 displays the percentages of students who underachieved in math under each criterion. Table 7 then displays the means and standard deviations of the scores for the students who underachieved at these levels in math, while Table 8 displays this information by condition, gender, and ability.
Table 6

Percentage of Underachievers by Category in the Area of Mathematics

<table>
<thead>
<tr>
<th></th>
<th>Low/Average Ability</th>
<th></th>
<th>High Ability</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male(^a)</td>
<td>Female(^b)</td>
<td>Male(^c)</td>
<td>Female(^d)</td>
</tr>
<tr>
<td>2.0 SEM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>.00</td>
<td>.63</td>
<td>6.06</td>
<td>.00</td>
</tr>
<tr>
<td>Control</td>
<td>.00</td>
<td>.91</td>
<td>7.14</td>
<td>.00</td>
</tr>
<tr>
<td>1.5 SEM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>1.81</td>
<td>3.14</td>
<td>6.06</td>
<td>.00</td>
</tr>
<tr>
<td>Control</td>
<td>4.08</td>
<td>2.73</td>
<td>7.14</td>
<td>.00</td>
</tr>
<tr>
<td>1.0 SEM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>8.48</td>
<td>8.18</td>
<td>12.12</td>
<td>12.90</td>
</tr>
<tr>
<td>Control</td>
<td>11.22</td>
<td>11.81</td>
<td>14.29</td>
<td>15.38</td>
</tr>
</tbody>
</table>

*Note.* Scores presented are percentages out of cell size.

\(^a\): Experimental \(n = 165\), Control \(n = 98\).  
\(^b\): Experimental \(n = 159\), Control \(n = 110\).  
\(^c\): Experimental \(n = 33\), Control \(n = 14\).  
\(^d\): Experimental \(n = 31\), Control \(n = 13\).
Table 7

*Mathematics Scores for Expected Achievers and Underachievers by SEM Criterion Level*

<table>
<thead>
<tr>
<th></th>
<th>Expected Achievers</th>
<th>Underachievers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>M</em></td>
<td><em>SD</em></td>
</tr>
<tr>
<td>2.0 SEM(^a)</td>
<td>15.34</td>
<td>4.79</td>
</tr>
<tr>
<td>1.5 SEM(^b)</td>
<td>15.44</td>
<td>4.79</td>
</tr>
<tr>
<td>1.0 SEM(^c)</td>
<td>15.78</td>
<td>4.79</td>
</tr>
</tbody>
</table>

\(^a\): Expected \(n = 618\), Underachievers \(n = 5\). \(^b\): Expected \(n = 605\), Underachievers \(n = 18\). \(^c\): Expected \(n = 560\), Underachievers \(n = 63\).

Table 8

*Means and Standard Deviations of Mathematics Scores by Condition, Gender, and Ability*

<table>
<thead>
<tr>
<th></th>
<th>Experimental</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>M (SD)</em></td>
<td><em>M (SD)</em></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Ability</td>
<td>17.76 (4.82)</td>
<td>15.57 (4.29)</td>
</tr>
<tr>
<td>Low/Average</td>
<td>14.11 (4.24)</td>
<td>15.20 (4.73)</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Ability</td>
<td>19.39 (5.19)</td>
<td>17.92 (5.52)</td>
</tr>
<tr>
<td>Low/Average</td>
<td>14.96 (4.60)</td>
<td>15.35 (5.00)</td>
</tr>
</tbody>
</table>

**Prevalence.** To test Hypotheses 2a and 2b, a direct logistic regression analysis was performed using the presence/absence of mathematics underachievement as the outcome and ability, gender, and condition as predictors. A test of the full model with all
three independent variables against a constant-only model was not statistically
significant, $\chi^2 (3, n = 623) = 5.78, p = .12$, Nagelkerke $R^2 = .10$, indicating that the
predictors as a set did not reliably distinguish between math achievers and
underachievers. When the criterion was lowered to the moderately-conservative level, the
full model was again not statistically significant, $\chi^2 (3, n = 623) = .70, p = .87$,
Nagelkerke $R^2 = .01$. Finally, when the criterion for underachievement was reduced to the
relaxed level, the full model was unable to distinguish achievers in math from those who
underachieve, $\chi^2 (3, n = 623) = 2.55, p = .47$, Nagelkerke $R^2 = .01$.

**Magnitude.** Hypotheses 2a and 2b were examined in a different manner to
determine whether the magnitude of underachievement in mathematics varies by ability
and condition. Thus, a $2 \times 2 \times 2$ between-subjects analysis of variance was performed on
the dependent variable of the difference between the observed math performance and the
expected math performance. The independent variables included condition (control and
experimental), ability level (high and low/average), and gender (male and female). The
findings for Hypothesis 2a did not indicate a significant interaction between the two
independent variables of ability and condition, $F(1, 615) = 3.90, p = .05$, $\eta^2 = 0.01$. Main
effects were non-significant for condition, $F(1, 615) = 1.62, p = .20$, $\eta^2 = 0.00$, and for
ability level, $F(1, 615) = .07, p = .80, \eta^2 = 0.00$. Furthermore, the testing of Hypothesis
2b revealed no significant interaction between the three independent variables, $F(1, 615)
= .73, p = .79, \eta^2 = 0.00$. Similarly, there were no significant interactions between gender
and ability level, $F(1, 615) = 1.96, p = .16, \eta^2 = .00$ or condition and gender, $F(1, 615) = .02, p = .89, \eta^2 = 0.00$. The main effect of gender also was not significant, $F(1, 615) = 4.26, p = 0.04, \eta^2 = .01$. 
CHAPTER IV: DISCUSSION

In schools across the country, decisions are made based upon the results of academic achievement assessments. These decisions determine educational programming, placement, and focus of instruction; therefore, the validity of academic assessments is vital for achieving the primary goals of the education system. Validity, however, can be compromised by a variety of factors, including intentional manipulation of the results by examinees. While some students may attempt to demonstrate their best possible performance, other students may engage in purposeful underachievement in an attempt to be more socially accepted (Moore, 1997; Rimm, 2008). According to previous research, students with high levels of ability report that they are likely to engage in underachievement strategies at the upper grade levels (Filkins, 1995; Juvonen & Murdock, 1993; Moore, 1997). These studies, however, did not systematically or directly examine the presence or absence of such phenomena at the elementary levels.

In the current study, level of achievement across academic skill and student ability levels was examined under peer review. Specifically, performance on math and reading measures was examined separately to determine whether achievement levels differ when students believed results of academic assessments would be shared with their classroom peers. In addition, the role of gender was considered in understanding the relationship between underachievement and peer review. Potential effects were examined in terms of magnitude and prevalence.
Results, however, indicated that the peer-review condition did not alter the prevalence or magnitude of faking-bad behavior for high-ability students in reading or mathematics. Moreover, the prevalence and magnitude of underachievement were not different between males and females in either skill area. These findings are in contrast to those of previous studies that have suggested high levels of faking-bad behavior (e.g., Boehnke, 2008; Filkins, 1995; Fordham & Ogbu, 1986; Henagan & Bedaian, 2009; Hudgins, 2008; Tyson, Darrity, & Castellino, 2005).

**Potential Explanations for Inconsistency with Prior Research**

**Grade-Level Differences.** While attachment theorists have identified the parent-child relationship as the most influential factor early in childhood (Ainsworth, 1969; Bowlby, 1958), peer socialization begins to become more important as children grow older (Hartup, 1978). The age at which this occurs, however, seems to be unclear. Some researchers have found that the peer system becomes influential during mid-adolescence, which is defined as approximately age 15 (Hartup, 1979). Recent studies of preschoolers and kindergarteners, however, have identified the effects of peer influence as early as ages 4 and 5 (Haun & Tomasello, 2011; Smith & Fowler, 1984).

Regarding the effect of peer influence on achievement, previous studies have indicated faking-bad behavior by high-ability students during adolescence (e.g., Boehnke, 2008; Filkins, 1995; Ford, Granthem, & Whiting, 2008; Fordham & Ogbu, 1986; Henagan & Bedaian, 2009; Juvonen & Murdock, 1993; Schlenker, 1980). In contrast, the current study featured a younger sample of students drawn from the intermediate elementary grades. For example, Juvonen and Murdock (1993) concluded that eighth grade students believe there are differential consequences of ability/effort depending on
whether they interact with peers or adults. Similarly, Filkins (1995) and Boehnke (2008) identified the reported presence of faking-bad behavior in high-ability students, but the sample consisted of seventh, eighth, and ninth graders. Similarly, Fordham and Ogbu (1986) found that students report engaging in underachievement in an effort to avoid negative interactions with peers, but these researchers also looked exclusively at middle school students. Therefore, while faking-bad behavior has been reported to occur at the middle school level, the current findings suggest that social pressure may not adversely affect reading or math performance during elementary school.

**Skill Domains.** Prior studies have indicated that high-ability students are likely to display inaccurate self-presentation (Daubman, Heathering, & Ahn, 1992; Forsyth, Schlenker, Leary, & McCown, 1985; Heatherington, Townsend, & Burroughs, 2001; Roberts, 1991; Brown, Uebelacker, & Heatherington, 1998). Performance on a standardized measure of reading, however, was not specifically examined in the aforementioned studies. Instead, GPAs and the composite scores of recent standardized achievement measures were used. Therefore, while an elevated prevalence and magnitude of faking-bad behavior might be observed on global measures of achievement, such purposeful underachievement does not appear to occur in the area of reading during pre-adolescence. Similarly, mathematics performance in this context has only begun to be investigated (Boehnke, 2008), but, as previously mentioned, the presence of faking-bad behavior had not yet been examined in the context of elementary mathematics achievement.

**Methodology Differences.** Another possible reason for the differences between the findings of previous research with those of the current study could be related to

Although the study by Boehnke (2008) was unique in that it was a large study examining the effects of social pressure on the achievement of middle school students, this study also had several notable methodological limitations. In particular, rather than defining ability by intellectual functioning or a comprehensive measure of achievement, ability was defined as student performance on three math items. Therefore, the categorization of students as high math ability versus lower math ability may not have been a valid method of identification. Further, outcome measures of skills were not included in the Boehnke study, as he examined self-reports of how often the students felt their performance contributed to receiving negative comments from peers. Therefore, while students’ emotional well-being was shown to be impacted, it is unclear if they actually altered their performance due to such social pressures. Thus, while the previous results suggest differential self-report of achievement, they did not directly test if students lower their actual performance.

**Limitations**

The current study has several limitations that must be considered before drawing implications from the results. First, the regression equations used to predict expected
achievement levels accounted for 53% of the variance in reading achievement and 44% of the variance in mathematics. While the expected scores were based on various predictors, including previous cognitive and achievement measures, much of the variance is unexplained by known variables.

Moreover, when determining underachievement, the criterion had to be lowered from a stringent level, to a moderately-conservative level, and finally to a relaxed level to explore the possible presence of underachievement. In so doing, the possibility of observed differences being attributed to measurement error increased substantially. However, even with the relaxed (least-stringent) criterion, no differences were observed.

Another potential limitation involves the amount of social pressure created by the peer-review condition. Within the current study, peer influence was artificially introduced by informing the students that their papers would be peer-reviewed following the assessment; however, the effect of this knowledge of a later event may not have been sufficient to raise self-awareness and alter performance. It is possible that elementary-age students are more influenced by a concurrent or previous social situation as opposed to the perception of a future event. To address this issue in a future study, students could be asked to review each other’s work on an alternative assignment immediately before beginning the assessments being examined for the study.

Finally, because the participants in this study were drawn from one large suburban school district, replication is needed in multiple school districts to examine generalizability to the broader population of children in the intermediate grades. In particular, the current sample largely consisted of students of well-educated parents and students with a relatively high level of cognitive ability ($M = 107.35$). Therefore,
replication would ensure that extraneous variables, such as socio-economic status, do not play a role in the presence or absence of faking-bad behavior at the elementary level.

**Directions for Future Research**

Given the limitations of the current and previous studies, additional research is necessary to further understand the phenomenon of faking bad in high-ability elementary-age students. For example, future research should focus on predicting achievement levels with greater accuracy by incorporating additional variables (e.g., student motivation and engagement) into predictive models. Increasing accuracy, in turn, will decrease the standard error of prediction and increase precision in the identification of students who are underachieving relative to expectations.

Also with respect to design, randomly assigning students to an experimental group that is exposed to peer influence and a control group that is not exposed to such social pressures is warranted. Researchers may consider the use of an authentic peer-viewing condition as opposed to the perception of a future peer-review condition to determine if this difference contributes to varying achievement. In addition, achievement outcomes in specific subject areas should be directly measured rather than using surveys of perceived peer influence or composite GPAs.

With respect to future studies, it would be important to target adolescent students to determine if previous findings regarding high levels of faking-bad behavior hold true under experimental conditions such as those employed in the current study. Replication with additional samples of elementary-age students is also needed to confirm results of the current study. Finally, additional between-group comparisons should be examined to
determine if the findings replicate across various demographic groups (e.g., gender, grade level, socio-economic status).

**Implications**

By further exploring the phenomenon of underachievement, educators are better able to understand the circumstances under which students opt to engage in self-handicapping impression management strategies. In so doing, practitioners and researchers can apply this information to their interpretations of the results of academic achievement measures for specific profiles of high-ability students. Although the reported presence of purposeful underachievement in adolescence has been hypothesized by several researchers (Filkins, 1995; Juvonen & Murdock, 1993; Moore, 1997), the question of when such patterns emerge has not been definitively answered.

Given these findings, it is important for educators and researchers alike to consider the possibility that faking-bad behavior may not exist at the upper grade levels, either. Specifically, although previous research seems to conclude that a high degree of intentional underachievement is present for adolescents (Boehnke, 2008; Filkins, 1995; Fitzpatrick, 1978; Juvonen & Murdock, 1993), none of these studies directly examined the influence of social pressure on achievement using an experimental design. Thus, while students may feel negatively impacted by social pressure, whether their achievement is changed remains unknown. Therefore, due to methodology limitations of previous studies featuring samples of adolescent students and adults, it is unclear if validity is compromised by intentional underachievement while under peer-review conditions at any level. This resulting question emphasizes the need for replication with same-age as well as older student samples.
Conclusion

Due to the increasing prevalence of high stakes testing resulting from federal legislation such as No Child Left Behind, ensuring the validity of scores from achievement measures is vital. However, the social pressures experienced by students have been hypothesized to result in adverse effects on achievement and significant levels of underachievement at the middle and high school levels. Previous studies, however, have measured this phenomenon indirectly and featured non-experimental designs. The results of the current study suggest that peer influence does not begin to adversely affect the achievement of high-ability students at the elementary level. These findings hold true across the subject areas of reading and math. Moreover, gender differences were not shown to have an effect on faking-bad behavior as well.

Although these findings differ from those of previous studies, methodological differences exist between this study and those conducted previously. In particular, the current study examined a younger age group, whereas the samples of previous studies consisted of adolescents and adults. Further, none of the research examined specific skill domains to determine the effect of faking-bad behavior by subject area. Lastly, the current study examined direct measures of achievement, while previous researchers gathered data indirectly through self-report and qualitative information.

While the current results potentially provide insight regarding an important aspect of test score validity, some limitations were identified. For example, the peer-review condition may not have resulted in a large degree of social pressure. Further, the sample of students came from one school district and may not have been representative of
students with more diverse backgrounds. Because of such limitations, replication with additional samples of students is necessary.

Although replication is necessary to draw firm conclusions, the current findings suggest that intentional underachievement does not occur at the elementary level under peer-review conditions, and this holds true for both reading and mathematics. Conversely, the findings raise potential questions regarding the results of previous studies with adolescents and adults. As such, additional studies are necessary with these populations as well, and these studies should feature several aspects of the current methodology (e.g., use of direct measures, experimental manipulation of conditions) to further advance understanding of the purported faking-bad phenomena.
References


Deno, S. L., Marston, D., & Tindal, G. (1986). Direct and frequent curriculum-based measurement: An alternative for educational decision making. *Special Services in the Schools, 2*, 5-27. doi: 10.1300/J008V02n02_02


Appendix A: Sample Probe for Reading Comprehension

Raven and Crow were always at odds. The two birds looked very much (down, make, alike), but they were very different. Crow (laughed, liked, clumsy) to mock the animals of the (upon, forest, ground). He would perch in the treetops (air, the, and) snicker down at them.

"Look at (you, growled, she)," he laughed at Mother Bear one (morning, creature, at). "You're so boring and clumsy."

"Be (that, graceful, quiet), Crow," Raven said. "It is not (confused, from, wise) to make enemies of your neighbors."

"Ah, Hah, Soj!" laughed Crow. "Mother Bear is not (my, came, me) neighbor. I am a graceful creature (from, to, that) the air. She is a clumsy (got, treetops, creature) on the ground."

"You!" growled Mother (Crow, Bear, me) when she came upon Raven perched (from, on, laughed) a stump at twilight. "Was that (you, she, came) laughing at me from the treetops?" (Should, Crow, Mother) and Raven looked so similar that (many, pretending, very) animals get them confused.

"It was (en, is, not) I," said Raven. "It was Crow."

"When, If, How do I know that you are (not, teach, from) Crow pretending to be Raven?" asked (clumsy, Mother, Crow) Bear. "That's just the kind of (trick, creature, out) that Crow would pull."

"I know," (carried, said, I) Raven. "Someone should teach him a (piece, lesson, next)."

"I have an idea," said Mother (was, air, Bear). "I will share it with you, (from, if, sparkle) you are willing to work with (a, but, would) clumsy creature that is stuck on (teach, the, and) ground."

"I would be honored," said (animals, when, Raven). Together they carried out Mother Bear's (clamped, beak, plan).

The next day Crow was soaring (through, over, could) the air when a spark fell (his, wishing, they) attention. It was a piece of (before, time, silver) trapped in a tree stump. All in, crows, places, love beautiful objects, and Crow was (many, no, Mother) different. He stuck his beak in (and, was, the) trunk and clamped it over the (silver, animals, attention). However, with the silver in his (beak, tree, next), Crow could not get his head (over, at, out) of the stump.

The other animals (wishing, laughed, always) at and teased Crow as they (very, watched, looked) him from their hiding places. Crow (before, snicker, stood) with his shoulders hunched and his (head, other, day) in the stump wishing he could (disappear, perch, upon). Maybe next time Crow will think (with, idea, twice) before laughing at someone.
Appendix B: Sample Probe for Mathematics

1. Use the graph to answer the question.

Temperature Over a Week

<table>
<thead>
<tr>
<th>Days</th>
<th>High Temp (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun</td>
<td>70</td>
</tr>
<tr>
<td>Mon</td>
<td>65</td>
</tr>
<tr>
<td>Tues</td>
<td>75</td>
</tr>
<tr>
<td>Wed</td>
<td>80</td>
</tr>
<tr>
<td>Thurs</td>
<td>85</td>
</tr>
<tr>
<td>Fri</td>
<td>80</td>
</tr>
<tr>
<td>Sat</td>
<td>70</td>
</tr>
</tbody>
</table>

What was the highest temperature recorded during the week?

_____ °F

2. Write the answer in the blank:

20 + 7 + 400 = _______

3. Write the answer in the blank:

What is the length of the key?

_____ in.

4. Write the correct letter in the blank.

Anthony had 9 oranges. He joined 5 1/2 oranges. How many oranges are left?

A 2 1/4
B 2 1/3
C 2 3/4

5. Write the answer in the blank.

What is the total weight of the fruits?

<table>
<thead>
<tr>
<th>Fruits</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>1650 grams</td>
</tr>
<tr>
<td>Grapes</td>
<td>75 grams</td>
</tr>
<tr>
<td>Apricots</td>
<td>150 grams</td>
</tr>
</tbody>
</table>

_____ grams
6. Write the correct letter in the blank.
   And build a structure with wooden sticks. Which number sentence gives the height of the structure?
   
   \[ \begin{align*}
   \text{cm} & \quad \text{in} \\
   7 & \quad 2 \frac{1}{2} \\
   \end{align*} \]
   A. 2 + 1 + 7  
   B. 2 + 2 + 2  
   C. 2 + 7 + 7  

7. Complete the sequence.
   65, 56, 47, ________  

8. This chart shows the area of different countries of the world.

<table>
<thead>
<tr>
<th>Country</th>
<th>Area (Square Kilometers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>1,904,569</td>
</tr>
<tr>
<td>Libya</td>
<td>1,753,540</td>
</tr>
<tr>
<td>Iran</td>
<td>1,641,195</td>
</tr>
<tr>
<td>Mongolia</td>
<td>1,564,100</td>
</tr>
</tbody>
</table>

   Which country has the largest area?  

9. Find the missing number to make this statement true.
   \[ 7 \times (5 + 9) = 7 \times 6 + 7 \times _______ \]

10. Write the correct letter in the blank.
    Which option below shows 2 parallel lines?
    
    A.  
    B.  
    C.  

11. Use the table to answer the question.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time Taken by Daniel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprinting</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Cycling</td>
<td>10 minutes</td>
</tr>
<tr>
<td>Swimming</td>
<td>40 minutes</td>
</tr>
<tr>
<td>Running</td>
<td>10 minutes</td>
</tr>
</tbody>
</table>

   What is the total time taken by Daniel for his cross-country marathon practice?
   ________ hour ________ minutes
12. What is the temperature as shown on the thermometer?

13. Use the table below to answer the question.

<table>
<thead>
<tr>
<th>Package</th>
<th>Cost per Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrylic paint</td>
<td>$5.25</td>
</tr>
<tr>
<td>Glue sticks</td>
<td>$3.80</td>
</tr>
<tr>
<td>Fabric glue</td>
<td>$7.60</td>
</tr>
</tbody>
</table>

Taylor is buying items for a craft project. How much more money will Taylor spend if she buys a package of fabric glue instead of a package of glue sticks?

$_______

14. Write the correct letter in the blank.
Mr. Garcia can shovel snow from a 100-foot-long driveway in 8 hours. How long will it take him to shovel snow from a 600-foot-long driveway?

A. 48 hours
B. 12 hours
C. 48 hours

15. Write the answer in the blank.
The picture shows a part of a wall. What fraction of this part of the wall is marked?

_____
16. Write the correct letter in the blank.

The diagram shows the pattern of tiles Peter is using on his kitchen wall.

Which row of tiles is the bottom row missing from Peter's kitchen wall?

A

B

C

17. A ZIP code for Danville, Virginia is 23901.
Which digit is in the hundreds place?

________

18. Use the graph to answer the question.

Olivia is at an amusement park. She wants to ride a roller coaster. Write the coordinates of the roller coaster.

________

19. Write the correct letter in the blank.

Helicopter A weighs 27,200 kilograms (kg) and helicopter B weighs 30,230 kg. What is the best estimate of the difference in the weight of the two helicopters?

A 1000 kg
B 1000 kg
C 1000 kg

20. Find the missing number to make this statement true.

$2 + 2 + 7 = 8 + ________$
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. Write the next two numbers of the sequence.</td>
<td>62, 64, 67, 68, 69</td>
</tr>
<tr>
<td>22. Write the correct letter in the blank.</td>
<td>A. One thousand twenty-one hundred</td>
</tr>
<tr>
<td>23. Write the answer in the blank.</td>
<td>A clown is distributing stuffed toys shown above. What is the chance that the toy he takes out from his bag is a pig?</td>
</tr>
<tr>
<td>24. Write the correct letter in the blank.</td>
<td>What fraction below shows 3/4?</td>
</tr>
</tbody>
</table>

### Math Problems

- (6 - 5) + 8 = 7 + ____________
- Which of these numbers is ten times as much as 41? A. 410 B. 41 C. 0.41
- This cake has 7 slices. If you eat 1 slice, what fraction of the cake did you eat? [diagram of a cake divided into 7 slices]
28. Write the correct letter in the blank.

The picture below represents the number sentence $7 \times 3 = 21$.

Which number sentence shows the inverse of the number sentence above?

A. $21 \times 2 = 63$
B. $21 \div 7 = 3$
C. $21 - 7 = 14$

29. Write the answer in the blank.

How many outcomes are possible on this spinner? (Assume the spinner cannot land on a line.)

30. Write the correct letter in the blank.

Convert $\frac{25}{2}$ to a decimal.

A. 33.2
B. 3.2
C. 16.5

_______
Appendix C: Procedural Directions

Teacher Instructions for the control condition.

“Please complete this (reading/math) worksheet. When everyone has finished the items, your papers will be collected and graded by me.”

Teacher Instructions for the peer-viewing condition.

“Please complete this (reading/math) worksheet. When everyone has finished the items, you will be asked to trade papers with a classmate, who will correct and grade your work.”
Appendix D: Preliminary Analyses

The first step in the process of determining the presence of underachievement was the building of an equation using the comparison students for each of the outcome measures of reading achievement and math achievement. To determine the best predicting equations, all possible combinations of the three independent variables were attempted, which included statewide testing scores, supplemental services, and grade. For both outcome measures, the use of all three predictor variables accounted for the largest amount of variance and the smallest amount of error.

Reading

Table 7 displays the descriptive statistics and correlations between the variables, while Table 8 displays the unstandardized regression coefficients, the standardized regression coefficients, the semipartial correlations, and $R$, $R^2$, and adjusted $R^2$ after entry of the independent variables. $R$ was significantly different from zero at the end of each step. After Step 3, with all independent variables in the equation, $R = 0.73$, $F(3, 96) = 36.29, p < 0.01$.

After Step 1, with PSSA Reading scores in the equation, $R^2 = 0.35$, $F_{inc} (1, 98) = 51.83, p < 0.01$. After Step 2, with supplemental reading services added to the prediction of achievement, $R^2 = 0.17$, $F_{inc} (2, 97) = 33.34, p < 0.01$. After Step 3, with grade added to the prediction of achievement, $R^2 = 0.02$, $F_{inc} (3, 96) = 3.73, p < 0.05$. Thus, addition of supplemental reading services and grade to the equation resulted in significant increments in $R^2$. The standard error of the prediction was determined to be 5.87; thus, scores that fall two standard errors below the predicted value would fall 11.748 points below the predicted reading achievement score.
### Table D1

*Descriptive Results of Independent Variables on Reading Achievement*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Reading</th>
<th>PSSA Reading</th>
<th>Supplemental Reading Services</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSSA Reading</td>
<td>.588</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplemental</td>
<td>-.637</td>
<td>-.469</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Reading Services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>.246</td>
<td>.077</td>
<td>-1.83</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*\( M \) 19.77 1429.52 .22 4.49
\n*\( SD \) 8.45 166.55 .42 .50*
Table D2

*Sequential Regression of Independent Variables on Reading Achievement*

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>B</th>
<th>$sr^2$ (incremental)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSSARead</td>
<td>.02</td>
<td>.37</td>
<td>.35**</td>
</tr>
<tr>
<td>SuppRead</td>
<td>-8.88</td>
<td>-.437</td>
<td>.17**</td>
</tr>
<tr>
<td>Grade</td>
<td>2.31</td>
<td>.14</td>
<td>.02*</td>
</tr>
</tbody>
</table>

*Notes. $R^2 = 0.53$, Adjusted $R^2 = 0.52$, $R = 0.73$, ** $p < 0.01$, * $p < 0.05$.>*

**Math**

Table 9 displays the descriptive statistics and correlations between the variables, while Table 10 displays the unstandardized regression coefficients, the standardized regression coefficients, the semipartial correlations, and $R$, $R^2$, and adjusted $R^2$ after entry of the independent variables. $R$ was significantly different from zero at the end of each step. After step 3, with all independent variables in the equation, $R = 0.66$, $F(3, 96) = 24.75$, $p < 0.01$.

After step 1, with PSSA Math scores in the equation, $R^2 = 0.23$, $F_{inc} (1, 98) = 25.59$, $p < 0.01$. After step 2, with supplemental math services added to the prediction of achievement, $R^2 = 0.42$, $F_{inc} (2, 97) = 31.60$, $p < 0.00$. After step 3, with grade added to the prediction of achievement, $R^2 = 0.44$, $F_{inc} (3, 96) = 3.41$, $p < 0.05$. Therefore, similar to that found for reading achievement, addition of PSSA Math scores, supplemental services, and grade to the equation results in a reliable improvement in $R^2$. The standard error of math prediction was determined to be 3.98; therefore, scores that are two
standard errors below the predicted value fall 7.96 points below the expected math achievement score.

Table D3

Descriptive Results of Independent Variables on Math Achievement

<table>
<thead>
<tr>
<th>Variables</th>
<th>Math</th>
<th>PSSAMath</th>
<th>Supplemental Math Services</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSSAMath</td>
<td>.48</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplemental Math</td>
<td>-.58</td>
<td>-.37</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Services</td>
<td>.17</td>
<td>-.05</td>
<td>-.09</td>
<td>1.00</td>
</tr>
<tr>
<td>Grade</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\( M \)  
\begin{align*}
  &14.95 & 1523.30 & .20 & 4.49 \\
  &5.33 & 176.53 & .40 & .50 \\
\end{align*}
Table D4

*Sequential Regression of Independent Variables on Math Achievement*

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>B</th>
<th>$sr^2$ (incremental)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSSAMath</td>
<td>.01</td>
<td>.31</td>
<td>.23**</td>
</tr>
<tr>
<td>SuppMath</td>
<td>-5.87</td>
<td>-.45</td>
<td>.19**</td>
</tr>
<tr>
<td>Grade</td>
<td>1.48</td>
<td>.14</td>
<td>.02*</td>
</tr>
</tbody>
</table>

*Notes. $R^2 = 0.44$, Adjusted $R^2 = 0.42$, $R = 0.66$, **p < 0.01, *p < 0.05.*
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EDUCATION

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Dissertation: Faking bad: Do high-ability elementary students intentionally when their work is peer-reviewed?
Advisor: Dr. James C. DiPerna, *Special Proficiency – Measurement*

**Master of Science, School Psychology.** Fall 2005
The Pennsylvania State University, State College, PA
Thesis: Validity of the GCA in the presence of discrepant and non-discrepant factor scores
Advisor: Dr. Marley W. Watkins

**Bachelor of Arts, Psychology; Minor: Education,** Spring 2002
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Thesis: The theory of affordances as applied to infants age 6-9 months
Semester Abroad: Lorenzo de Medici Institute - Florence, Italy, Spring 2001

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**School Psychologist,** Associates for Counseling and Educational Services, Doylestown, PA, 10/08 - current
**School Psychologist Pre-doctoral Intern,** Pennridge School District, Perkasie, PA, 08/07 – 8/08
**Part-time Graduate Assistant on Feeding Grant,** The Pennsylvania State University, Great Valley, PA, 08/07 – 12/07
**Residential Trainer,** Cerebral Palsy Association, Toms River, NJ10/02 - 08/03, 06 - 08/04, 06 - 08/05, 06 - 12/06
**Half-time Graduate Assistant: Peer/Mentor/Tutor,** The Pennsylvania State University, State College, PA, 08/05 – 06/06
**Instructor for Gifted First-Graders in Math,** Merion Elementary Gifted Program, Merion, PA09/00 - 12/00

RELATED VOLUNTEER EXPERIENCE

**Institutional Review Board Member,** Delaware Valley College, Doylestown, PA, 05/10 – current
**Member & Grant Writer,** Autism Cares Foundation, Newtown, PA, 02/08 – 05/10
**Co-chairperson,** Haverford/Bryn Mawr College Pen-Pal Program, Haverford, PA, 09/01 - 05/02
**Elementary Student Mentor,** Heston School Mentoring Project, Philadelphia, PA, 09/98 - 05/99

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School Psychologist in Pennsylvania (April, 2007) & New Jersey (April, 2008)
CPR (American Red Cross - July, 2007)
First Aid (American Red Cross - June, 2006)
Developmental Disabilities (American Red Cross – October, 2002)