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The Link Between Cognitive Ability and Scholastic Cheating: A Meta-Analysis

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Do less able students cheat more? Although relevant research has been published over the past eight decades, no consensus has been reached. We reviewed all studies using objective measures of both ability and cheating. A comprehensive search yielded 20 such articles, including 22 samples, that estimated the ability-cheating association. A meta-analysis yielded a clear conclusion: all associations between ability and cheating were negative with a median value of −.26. The pattern was also robust across contrived versus noncontrived cheating situations, collaborative versus noncollaborative cheating, choice of ability measures, and educational levels. The associations were somewhat lower when cheating detection methods were "high-tech" rather than traditional. Broader implications are discussed.

Keywords: intelligence, cheating, scholastic tests

Several comprehensive reviews of scholastic cheating are now available (Anderman & Murdock, 2007; Cizek, 1999; Crown & Spiller, 1998; Davis, Drinan, & Gallant, 2011; Kisamore, Stone, & Jawahar, 2007; Whitley & Keith-Spiegel, 2002). In our view, one issue warrants further attention—namely, the impact of cognitive ability[1] on the likelihood of cheating. The reviews tend to minimize its impact or call for more evidence. Here we seek to summarize the empirical literature to reach a firm conclusion. We focus on objective cheating measures, including newer measures emanating from the latest technology.

Measuring Cheating

Self-report measures of cheating have been used in a number of studies investigating links with cognitive ability (e.g., Jackson, Levine, Furnham, & Burr, 2002; Kisamore et al., 2007; Thorpe, Pittenger, & Reed, 1999). In general, however, self-reports are deemed less trustworthy than concrete objective measures (Ziegler, MacCann, & Roberts, 2012). In the case of cheating research, self-reports do have the advantage in breadth of coverage: students may report on their lifetime history of cheating. Objective measures necessarily cover a limited context and duration—sometimes a moment or two during a laboratory session. Broad distrust of cheating self-reports ensues in part from empirical studies showing minimal associations with objective measures (e.g., Freeman & Ataov, 1960). Nowell and Laufer (1997), for example, directly compared self-reports with an objective measure using the randomized response technique to maximize anonymity: they found only a weak link. For these reasons, no clear conclusions about cheating can be drawn from research using self-reports.[2]

By contrast, objective measures of cheating avoid a key threat to validity—namely, socially desirable responding (e.g., Holden & Passey, 2009). Such measures come in a variety of forms. For example, researchers may record actual test answers before an answer key is made available. Then, when students are asked to provide an "updated" report on their answers, discrepancies (in the direction of the key) provide an objective indicator of cheating (e.g., Hoff, 1940). Other researchers have exploited witness reports from objective informants, for example, teachers or student peers (e.g., Hetherington & Feldman, 1964): this method has the advantage of including cheating attempts as well as "successful" cheating. Another method allowed students to steal grade vouchers (secretly coded) from the teacher's desk (Howells, 1938). The reviews cited earlier provide many more examples (Anderman & Murdock, 2007; Cizek, 1999; Whitley & Keith-Spiegel, 2002). Of special note are objective indicators emanating from new technology.

The New Technology

The cheating methods spurred by new technology have been met in kind with the development of sophisticated cheating detection software. Two types of programs have received the most attention. One type evaluates student essays to determine how much text has been cribbed from other sources. Most popular is the commercial program TurnItIn (Barrie, 1998), which has been adopted as standard practice by many schools throughout North America, Australia, and Europe. Submitted papers can be compared to (a) a databank of essays accumulated from the Internet by

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[1] We use the generic term *cognitive ability* to subsume concepts such as intelligence, scholastic ability, and academic aptitude.
[2] Note that the same caution should be applied to studies using self-report measures of cognitive ability (Paulhus, Lysy, & Yik, 1998).

the company, (b) the bank of papers saved by the course instructor, or (c) articles from journals and popular magazines.

The second kind of cheating detection software evaluates copying on multiple-choice exams. For an updated list of such programs, go to http://www.assessmentfocus.com/exam-security.php. Among the commercially available programs is Scrutiny! (Assessment Systems Corporation, 1993). Other programs are freely available from the authors, for example, Catch (Jennings, Harpp, & Hogan, 1996) and S-CHECK (Wesolowsky, 2000). Those programs compare the overlap of wrong answers across all pairs of students taking the same exam.

Most recent is a third method using time stamps to determine illicit collaboration among students (Bing et al., 2012). Here, the time stamps on submitted papers are compared along with the actual text to discern plagiarism.

The concrete objective nature of the new technology measures makes them especially credible for drawing firm conclusions about cheating. For that reason, we exploited them in our recent work comparing various predictors of cheating (Nathanson, Paulhus, & Williams, 2006; Williams, Nathanson, & Paulhus, 2010). The present review includes a comparison of results using these "high-tech" methods with those using more traditional cheating-detection methods.

Using a meta-analysis, our overall goal was to organize and clarify published research linking cognitive ability with the tendency to cheat in educational settings. Before turning to our key predictor, it behooves us to note several other links with individual differences.

Individual Difference Predictors of Cheating

Although the search for the honest personality has a long history (Hartshorne & May, 1928), reviews of personality predictors have been generally pessimistic (Cizek, 1999; Whitley, 1998). Admittedly, these reviews preceded newer candidates such as the Dark Triad of narcissism, Machiavellianism, and psychopathy (Paulhus & Williams, 2002). Other promising personality predictors include the imposter scale (Ferrari, 2005) and, especially, Ashton and Lee's (2008) Honesty-Humility factor (Kajonius, 2014; Perugini & Richetin, 2007).

Although studies of demographic predictors are mixed and controversial (Anderman & Murdock, 2007), experts do agree that academic cheating is tied to various sorts of negative academic attitudes. The highest reported likelihood of cheating is among students who (a) believe that cheating is the norm, (b) feel alienated from the scholastic system, and (c) feel that cheating is acceptable (Whitley, 1998). Cheating is also higher in students who focus excessively on performance goals rather than on mastery goals (Cizek, 1999).

The evidence is also clear that students with poorer academic performance are more likely to cheat. This finding applies equally to students with chronically poor performance as indicated, for example, by a low grade point average (GPA; Crown & Spiller, 1998; Miller, Murdock, Anderman, & Poindexter, 2007), to temporary unpreparedness indicated by poor performance in the current course, and even to a lower grade on the exam where cheating occurs (Antion & Michael, 1983). Clearly, failing students have more reason to cheat (Newstead, Franklyn-Stokes, & Armstead, 1996).

Although partly determined by raw ability, overall scholastic performance (e.g., GPA) is also a function of personality variables (Hair & Graziano, 2003; Poropat, 2009). In the present report, we focus on the narrower concept of cognitive ability.[3] Therefore, we do not include broader, multiply determined variables such as scholastic performance.

Cognitive Ability

Reviews take a variety of positions on the relation between cognitive ability and cheating. Of the comprehensive reviews, some are skeptical about any link between cognitive ability and cheating (Whitley & Keith-Spiegel, 2002, p. 30). Cizek (1999), on the other hand, concluded that there is a small negative association (p. 104). Others note that the direction of association is usually negative but provide few references (Anderman & Murdock, 2007; Crown & Spiller, 1998). Davis et al. (2011) dismissed the issue by claiming that only one study had been done (p. 78). In recent reviews by McCabe, a prominent leader in cheating research, the terms *IQ*, *intelligence*, *SAT*, *GRE*, and *cognitive ability* do not merit any mention (McCabe, 2005; McCabe, Butterfield, & Trevino, 2006).

Our Meta-Analysis

To pursue this issue further, we searched PYSCHINFO and Google Scholar to collect published empirical articles addressing associations between cognitive ability and scholastic cheating. Search combinations included the keyword *cheat* and one of *intelligence*, *ability*, or *aptitude*. The search covered the period 1879 through 2014 and yielded 37 published reports—far more than previous reviews. Of these, 20 articles (including 22 distinct samples) used objective measures of both cognitive ability and cheating. Table 1 presents key details of each study, including sample size, year of publication, educational level, and the correlation between cognitive ability and cheating: if the original results were reported in terms of mean differences or quartiles, we converted these values to Pearson correlation coefficients. To avoid possible bias toward publishing significant values, we include values regardless of significance level (Roberts, Kuncel, Wiechtbauer, & Bogg, 2007).

Together, they reveal an exceptionally consistent pattern: objective indicators of cheating are invariably associated with low cognitive ability. The negative association emerged from every single study: tabled values range from −.04 to −.58, with a median value of −.26. The likelihood that these values emerged from a null distribution is negligible ($p < .0001$). Following the meta-analytic procedures outlined by Rosenthal and Rosnow (1991), we calculated the (unweighted) mean[4] to be −.26 (SD = .12). According to Cohen's (1992) scheme, these values are in the range of medium effect sizes. Based on a random effects model, the parameter estimate was −.27.

Most authorities recommend application of a normalizing transformation before combining sets of Pearson correlations. There-

[3] Moreover, we restrict the construct to measures of fluid intelligence (Cattell, 1963; Ziegler, Danay, Heene, Asendorpf, & Buhner, 2012).

[4] We chose unweighted means and a random effects model to more fully represent the diversity of time periods and methods. A weighted means procedure would be dominated by a few large sample studies.

Table 1
Published Studies on Cognitive Ability and Scholastic Cheating Behavior

	N	Value of correlation	Education level	Cheating behavior	Contrived?	Collaborative?	Measure of cognitive ability
Hartshorne and May (1928)	850–2,644	−.35[a]	Grades 3–12	Five types of cheating	Not all	No	Stanford-Binet, among others
Brownell (1928)	30[b]	−.19	College	Informant reports	No	No	Unspecified
Tuttle (1931a)	889	−.15	Grades 4–7	Marking own test	Yes	No	Unspecified
Tuttle (1931b)[a]	1,055	—	—	—	—	—	—
Campbell (1933)	198	−.39	College	Change own grade	Yes	No	Stanford-Binet
Atkins and Atkins (1936)	110	−.22	College	Self-grading	Yes	No	Miller Analogies
Parr (1937)	406	−.33[c]	College	Self-grading	Yes	No	ACT
Howells (1938)	22; 30	−.20; −.36	College	Change own grade	Yes	No	Unspecified
Hoff (1940)	136	−.32	College	Change own grade	Yes	No	Unspecified
Drake (1941)	126	−.35[d]	College	Change own grade	Yes	No	Unspecified
Gross (1946)	129	−.16	Grade 7	Change own grade	Yes	No	Unspecified
Hetherington and Feldman (1964)	78	−.28[e]	College	Sum of four types of cheating	Not all	No	Concept Mastery Test
White, Zielonka, and Gajer (1967)	179	−.58; −.24[e]	College	Self-grading	No	No	SAT
Leveque and Walker (1970)	366	−.40	College	Change own grade	Yes	No	SRA placement battery
Fischer (1970)	43; 21	−.29; −.48	Grades 4–6	Self-grading	Yes	No	Otis; Kuhlman-Anderson
Johnson and Gormly (1972)	102	−.16	Grade 5	Duplicating and carbon copy	Yes	No	Unspecified
Kelly and Worell (1978)	591	−.16	College	Lab cheating	Yes	No	ACT scores
Nathanson, Paulhus, and Williams (2006)	150	−.22	College	Exam copying	No	Yes	Word test
Williams, Nathanson, and Paulhus (2010)	107	−.14	College	Plagiarism	No	No	Word test
Bing et al. (2012)	104	−.04	Business school	Illicit cooperation	No	Yes	ACT scores

[a] These data appear to be the same as in Tuttle (1931a): hence, they are not included in the meta-analysis. [b] This value is the median correlation with five types of academic cheating. [c] These 30 were compared to the full campus population. [d] Correlation estimated from quartile frequencies cited in the article. [e] Correlations estimated from mean differences provided in the article.

fore, we applied Fisher's variance-stabilizing conversion to the values in Table 1. The mean of those transformed values was then converted back to yield a value of $r = -.26$. As expected with small- to moderate-size correlations, the transformation process made little difference in the overall mean (Rosenthal & Rosnow, 1991). We then considered a series of moderator variables.

High-Tech Versus Traditional

The three newer studies (Bing et al., 2012; Nathanson et al., 2006; Williams et al., 2010) applied modern software techniques to index cheating. The ability-cheating correlations (−.04, −.14, −.22) were among the lowest in Table 1. The mean of −.13 was lower than the mean of studies using more traditional cheating detection (−.30) 1.55 and the difference reached significance despite the small hi-tech sample size, $t(20) = 2.25$, $p < .04$.

Temporal Era

To address stability over time, we performed two statistical tests. First, the mean correlation of the earliest 11 studies (−.275) did not differ from the mean of the last 11 studies (−.272), $t = 78$, *ns*. Second, we calculated the bivariate correlation of the cheating-ability correlation with year of data collection.[5] The bivariate correlation ($r = +.14$) was small in size and nonsignificant. In short, the negative correlation of ability with cheating stood up over time.

Collaboration or Not?

Note from Table 1 that, in two studies (Bing et al., 2012; Nathanson et al., 2006), the cheating behavior involved collusion with another student rather than solo misbehavior. Some have argued that such cheating does not qualify as cheating in the traditional sense. Certainly, the two types are qualitatively different (Chapman, Davis, Toy, & Wright, 2004).

In Table 1, the collaboration cases are among the lowest correlations: removal of these studies boosted the median slightly to .29 but had little effect on the mean. With so few collaborative studies, no significance test is possible, but the results are worth reporting for posterity.

Contrived or Not?

Some of these studies used so-called contrived situations: these are controlled laboratory studies giving participants the opportunity to cheat (e.g., Kelly & Worell, 1978). Other studies were noncontrived: these investigated actual scholastic contexts where cheating could influence course grades (e.g., Hartshorne & May, 1928; Hetherington & Feldman, 1964; Nathanson et al., 2006; Williams et al., 2010). For example, Hartshorne and May (1928) compared students' standard exam results with those obtained on a more scrutinized administration. Hetherington and Feldman (1964) used two such methods: (a) monitoring cheating during regular exams using a set of planted student observers and (b) checking for use of substitute booklets. Our earlier research investigated actual copying during exams (Nathanson et al., 2006) and plagiarism on term papers (Williams et al., 2010).

For comparison purposes, we calculated the mean values of ability-cheating correlations in the two types of study. Interestingly, no difference was found between the contrived studies (mean $r = -.26$) and noncontrived studies (mean $r = -.26$).

Educational Level

Finally, Table 1 indicates that 16 studies were conducted on college students and 6 studies on primary and secondary students. The mean correlation for college studies (−.27) was virtually identical to the mean found with studies on lower grades (−.26), $t(20) = .46$, $p = .35$.

Discussion

We found 22 studies that satisfied our criteria of objective measures of both cognitive ability and cheating. This collection was much more comprehensive than previous reviews, and we can draw firmer conclusions than previously hesitant statements. With this larger collection, we were able to provide analyses that address several specific issues. Although the reported correlations were not always significant in the smaller samples, they were remarkably consistent in size and direction. In short, cheaters tend to be less academically talented.

Of course, all tabled estimates would be improved by disattenuation of the objective behavior (cheating) indicators, as recommended by some researchers (Harms & Crede, 2010; Roberts et al., 2007; Rosenthal & Rosnow, 1991). In our data, this procedure proved to be problematic because many studies (especially the earlier ones) failed to provide reliability estimates for the cheating behaviors. To avoid inconsistency, then, we decided to present only the raw values and merely note that our results are conservative with respect to the size of the correlations.

The stability of ability-cheating correlations across eight decades indicates that the buffering impact of cognitive ability captures a phenomenon inherent in educational contexts. The correlations from recent studies still show the negative ability-cheating association despite revolutionary changes in cheating detection methods, educational philosophies, and changing social values.

The robustness of the ability-cheating effect is reinforced by the fact that only one significant moderator emerged. For example, we examined the long-time concern that contrived situations may not represent cheating situations as well as noncontrived situations (Hetherington & Feldman, 1964). Indeed, that concern motivated the choice in our own research to study typical levels of exam cheating rather than laboratory entrapment (Nathanson, Paulhus, & Williams, 2004; Williams et al., 2010). Hence, we could rule out an artifactual link between cognitive ability and cheating—namely, that intelligent students are not falling for an experimental ruse. Rather than "test wiseness," we wanted to assess the impact of cognitive ability.

Nonetheless, the data tabled in our meta-analysis showed little difference between contrived and noncontrived methods. Hence, the additional role of test wiseness in contrived situations appears to be minimal.

Another potential moderator was educational level. We were able to partition those studies conducted at the college level or

[5] We did not include the recent "high-tech" cheating studies because their lower values reflect a historical change in technology addressed in the previous moderator (high-tech vs. traditional).

above versus those on primary and secondary students. Given the greater ability variance in lower grades, one might expect higher correlations. No overall difference was evident. Whatever dynamics drive this association appear to be robust across educational levels.

Of special note, two studies entailed a social form of cheating, that is, illicit collaboration among students. However, they differed in several key aspects, and the ability-cheating values were dissimilar (−.22 vs. −.04). The weak correlation found by Bing and colleagues (2012) may be traced to their use of the unique time stamp technique to identify cheaters.

We suspect that both values were underestimates because the analyses required averaging data from the two colluding participants. These pairs could have involved a dominant but less able student persuading a passive but more able student to collude (Hetherington & Feldman, 1964). Or two less able students may have colluded to compensate for their common academic weakness. It may prove difficult, but future research should include interviews to determine the distinct roles of the two participants.

Similarly, we were unable to establish any differences related to the choice of instruments to tap cognitive ability. Those choices did cover the gamut of established and newer measures, with no striking exceptions in the size of the ability-cheating association (see Table 1).

One partitioning, comparing the three studies using modern ("high-tech") software versus the 19 using traditional cheating detection methods, proved more promising. Traditional methods (M = .30) showed a higher mean than high-tech methods (M = .13). The effect size was large (1.55), suggesting a possible avenue for further research.

Interpreting the Negative Association

Our confirmation of more cheating among students with lower cognitive ability still leaves the interpretation open to conjecture. A separate analysis of verbal and quantitative ability offers some insight (Williams et al., 2010): the fact that we found a stronger link with verbal ability is consistent with the fact that introductory psychology performance is based primarily on verbal rather than quantitative competence. Students with poor verbal ability would therefore be more concerned about failure given their previous difficulties with verbally challenging courses. This concern could then induce a motivation to compensate by cheating. If so, future research could isolate stronger effects by assessing students' differential self-efficacy across academic domains: we predict that individuals will cheat more in domains where they feel less competent.

Note that our findings are consistent with evidence of the broad explanatory power of cognitive ability (Kuncel, Hezlett, & Ones, 2004): that construct helps explain the overlap among academic achievement, preparedness, attitudes, and initial deficits in course-relevant knowledge. Often studied one at a time, the unique predictive power of each variable is difficult to assess. Future research with any of these variables should include a measure of cognitive ability to control for its overlap.

Our consistent finding of negative associations of ability with cheating has other possible interpretations. One involves identity development. Over time, more able students may develop a strong identity of self-efficacy in academic matters. This identity then becomes tied to a moral aversion to cheating (e.g., Thorkildsen, Golant, & Richesin, 2007) Alternatively, the more able students may be deterred from cheating because they are hypervigilant about any hint that cheating could be detected. It will take rather clever multiwave longitudinal studies to tease apart the "desperation," "identity," and "hypervigilance" interpretations.

Conclusions

The robustness of the ability-cheating association was sustained across all but one potential moderator: the association was lower among so-called high-tech methods compared to traditional methods of detecting cheating. The diverse nature of the latter methods (modern software, time stamps) makes any clarification difficult. Perhaps the unobtrusiveness of the high-tech methods undermines the advantage that hypervigilance offers to the more clever students. In the past, clever students may have been well aware of traditional detection methods and exerted caution. According to this argument, their cheating rate is now approaching that of the less able students. That increase would explain the attenuation of the ability-cheating correlation when high-tech methods are used. Note that this explanation is most consistent with the hypervigilance interpretation.

Generalizability

Our overall finding—that less able students cheat more—is not especially heartwarming. It seems that the obvious disadvantages of this ability handicap are compounded by the potential consequences of getting caught cheating. However, we caution against any global indictment of those who cheat out of desperation. There is no reason to believe that academically desperate students would engage in other forms of antisocial behavior. Individuals deficient in other domains (sports, financial resources, etc.) may cheat to compensate in those domains without spillover of that misbehavior to other domains.

It is true that some cases of scholastic cheating reflect a global antisociality (Blankenship & Whitley, 2000; Jackson et al., 2002). In turn, that general antisocial tendency can often be traced to "dark side" traits such as Machiavellianism, narcissism, and psychopathy (e.g., Paulhus & Williams, 2002). This notion is substantiated by work on Factor 6 of the HEXACO personality model (Ashton & Lee, 2008) and overt honesty scales (Nicol & Paunonen, 2002).

However, the contributions of ability and personality to scholastic outcomes tend to be independent (Chamorro-Premuzic & Furnham, 2008; O'Connor & Paunonen, 2007; Poropat, 2009). This independence extends specifically to the prediction of cheating (Jackson et al., 2002; Nathanson et al., 2006). In short, we see the ability-cheating link as a domain-specific phenomenon that operates independently of antisocial personality traits.

Broader attempts to link intelligence with antisocial behavior have often leaned in the opposite direction, postulating that superior abilities predispose individuals toward antisocial behavior. Consider the notion of "Machiavellian intelligence" (Byrne & Whiten, 1989): it suggests that the evolution of intelligence was intrinsically linked with interpersonally exploitative tendencies. Nonetheless, empirical research has consistently failed to support any association of darker personalities with intelligence (O'Boyle, Forsyth, Banks, & Story, 2013). Again, the robust link confirmed in our meta-analysis is, in our opinion, a by-product of the plight of the cognitively disadvantaged in competitive educational contexts.

Too Controversial?

Recall that our initial motivation for this report was to draw more attention to the ability-cheating link. However, why did previous reviews minimize its importance? Perhaps researchers were concerned with "blaming the victim": that is, if less able students are further disadvantaged by competitive scholastic testing, why draw further attention to their deficits? More generally, social scientists prefer to focus on psychological variables that are more amenable to change.

In our view, confirmation of this student vulnerability should encourage educators to redouble efforts to minimize cheating. If it can be prevented in the first place, cheating will not magnify the natural advantage of higher ability. Skimping on the modest costs of proven anticheating measures (e.g., multiple exam versions, spacious seating, better supervision, detection, and consequences) only worsens the plight of the academically challenged. The value of these methods has been well documented for some time (Anderman & Murdock, 2007; Cizek, 1999; Whitley & Keith-Spiegel, 2002). Although the use of honor codes and simple warnings may serve other pedagogical goals, they bypass institutional responsibility for creating cheat-free environments. Our identification of a consistent ability-cheating correlation across eight decades would not have been possible if anticheating measures had been applied more effectively.

At the same time, we offer no solution to the escalating cat-and-mouse game played between educators using high-tech methods to minimize cheating and clever students attempting to counter those methods. At some point, cheating may actually be more common among those with greater ability than those with deficits, thereby reversing the robust negative association we found over the past eight decades.

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