Predictors of a behavioral measure of scholastic cheating: Personality and competence but not demographics

Craig Nathanson, Delroy L. Paulhus *, Kevin M. Williams

Department of Psychology, University of British Columbia, 2136 West Mall, Vancouver, BC, Canada V6T 1Z4

Available online 25 May 2005

Abstract

Although many studies have examined individual difference predictors of cheating, insufficient attention has been given to several important personality variables (the Big Five, perfectionism, and subclinical psychopathy). Moreover, insufficient use has been made of concrete indicators of naturalistic scholastic cheating. Using a computer-based behavioral measure, we examined the correlates of multiple-choice exam cheating in several large undergraduate classes. In Study 1, 291 participants completed a comprehensive battery of personality measures. Their cheating on several subsequent exams was best predicted by their level of subclinical psychopathy. A possible artifact is that those high in subclinical psychopathy are less scholastically competent—a factor known to predispose cheating. To address this possibility in Study 2 ($N = 150$), we included measures of cognitive ability and a pre-course knowledge test. After controlling for both ability and prior knowledge, subclinical psychopathy remained a significant predictor of cheating behavior. Demographic variables such as gender, ethnicity and major did not add significantly to the prediction of cheating. Implications for educators and researchers of cheating are discussed.
© 2005 Elsevier Inc. All rights reserved.

Keywords: Cheating; Personality; Subclinical psychopathy; Scholastic competence; Scholastic dishonesty; Cognitive ability

---

* Corresponding author. Fax: +1 604 822 6923.
  E-mail address: dpaulhus@psych.ubc.ca (D.L. Paulhus).

1. Introduction

Student cheating remains a persistent problem for educators. Typical is the finding that two-thirds of college students report having cheated at some point during their schooling (Stern & Havlicek, 1986). If anything, the problem appears to have worsened in recent years (McCabe & Trevino, 1996) with students reporting lifetime cheating rates as high as 80% (Robinson, Amburgey, Swank, & Faulker, 2004).

In an effort to combat this problem, numerous methods have been developed for detection of cheating (for reviews, see Cizek, 1999; Frary, 1993). Of particular importance is the availability of new computer programs: Some of these are commercial, but others, such as Signum (Harpp, Hogan, & Jennings, 1996) and S-Check (Wesolowsky, 2000), are freely available from the authors. These programs conduct a pair-wise comparison of students' responses to multiple-choice tests to search for excessive overlap in the answer patterns. For each possible pair of students, an index of similarity is calculated: Those with suspiciously high overlap are flagged as potential cheating pairs (Frary & Tideman, 1997).

One such index, arguably the most intuitively compelling, is the Harpp–Hogan coefficient (Harpp & Hogan, 1993; Harpp et al., 1996). For any given pair of students, the value of the coefficient represents the relative proportion of overlapping errors to non-overlapping errors. Thus a larger value indicates greater answer similarity and a cut-off score of 1.0 is recommended to flag cheating pairs. This choice of cut-off score has proved effective in detecting cheating that was corroborated by other methods (Harpp et al., 1996).

Another more sophisticated similarity index is Wesolowsky's Zb (Wesolowsky, 2000). In familiar *z*-score format, this index controls for the ability level of students in calculating the similarity scores. Its calculation places special emphasis on the minimization of false accusations. Under conditions of no cheating, Zb scores yield a normal distribution. Therefore, outliers can be associated with *p* values. For details on the technical aspects of both the Harpp–Hogan and Zb indices, see our website (www.psych.ubc.ca/~dellab/cheatingprograms/).

A valuable technique for corroborating software indicators of cheating is to compare their results against seating locations during the exam. Finding that a flagged pair of students were seated adjacent increases the probability of collusion to near certainty. Note that these two cheating indicators are independent because computer programs do not use information about the seating arrangement of the students. Such verification has been critical in the validation of computer-based indicators such as S-check: Student pairs flagged by the program have almost invariably been found to be seated adjacent to one another (Harpp et al., 1996; Wesolowsky, 2000).

Confidence that these flagged similarities are exceptional may be strengthened by examining the Q–Q plot of all Zb scores. A sample Q–Q plot drawn from the current studies is provided in Fig. 1. As this figure indicates, the non-cheater similarity scores fall into a normal distribution. The potential cheating pairs clearly stand out. They are all outliers with Zb scores above the cutoff point of 4.00. The visual evidence of
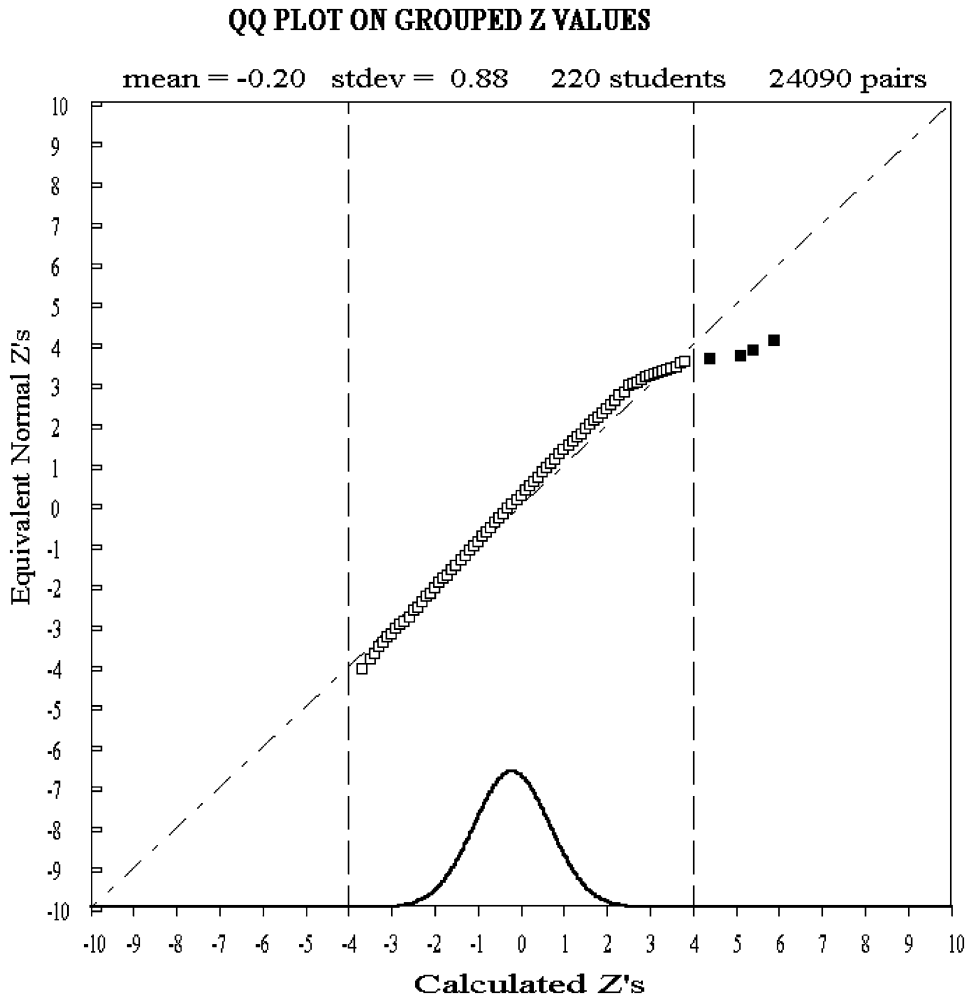
QQ PLOT ON GROUPED Z VALUES

mean = -0.20   stdev = 0.88   220 students   24090 pairs

Fig. 1. Representative Q–Q plot of answer similarity scores (Zb).

such outliers adds even more assurance that the similarity of such pairs is highly unlikely to be due to chance.[1]

After reviewing the available programs, we chose to use S-Check as our cheating detection software because of its sophistication and the range of cheating indices that it provides. These include the Harpp–Hogan index and Zb as well as a Q–Q plot that allows for visual confirmation of outlier similarities (Wesolowsky, 2000).

---

[1] We acknowledge that our measure of cheating is subject to the complex critiques of error-similarity indices (e.g., Dwyer & Hecht, 1996). A full discussion of these issues is beyond the scope of this paper, but our emphasis will be on the convergence of these indices with other forms of evidence such as seating charts.

1.1. Demographic predictors of cheating

To date, the search for the demographic predictors of cheating has proved to be disappointing. Although men are more likely to report having cheated than do women (e.g., Jensen, Arnett, Feldman, & Cauffman, 2002; Lobel & Levanon, 1988; Newstead, Franklyn-Stokes, & Armstead, 1996; Whitley, 1998), concrete measures of cheating do not confirm such a sex difference (McCabe, Trevino, & Butterfield, 2001; Whitley, Nelson, & Jones, 1999).

Students with science majors reported higher levels of cheating than those with arts majors (Newstead et al., 1996). Given the sex difference in reporting cheating, however, the difference in arts vs. science cheating rates may be artifactual. That is, the higher rate in reported cheating among science students may result from the higher proportion of men in science majors. Altogether, then, the literature gives little indication of demographic differences in actual cheating behavior.

1.2. Personality predictors

There is a long history of research on personality predictors of cheating (for thorough reviews see Cizek, 1999; Whitley, 1998). A recent meta-analysis provided the effect sizes of a wide range of personality constructs including achievement motivation, alienation, industriousness, test anxiety, need for approval, religiosity, and self-esteem (Whitley & Keith-Spiegel, 2002). The reviews concluded that, on the whole, the associations of personality with cheating were null to weak.

However, a number of personality variables have not yet been given sufficient attention. These include subclinical psychopathy, perfectionism, and the Big Five personality dimensions (i.e., Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience). For possible inclusion in our own research, we will consider each in some detail.

1.3. The Dark Triad

Of particular interest are those personalities recently studied under the rubric of the 'Dark Triad,' namely, narcissism, Machiavellianism, and subclinical psychopathy (Paulhus & Williams, 2002). Those high in narcissism are characterized by grandiosity, entitlement, and a sense of superiority over others (Raskin & Hall, 1979). Such individuals are arrogant, self-centered, and consistently self-enhancing (Paulhus, 1998).

Individuals high in Machiavellianism are characterized by cynicism and the manipulation of others (Christie & Geis, 1970). A wealth of evidence confirms that these individuals exploit a wide range of duplicitous tactics to achieve their self-interested goals (e.g., Fehr, Samsom, & Paulhus, 1992).

Finally, those high in subclinical psychopathy are characterized by cold emotion, interpersonal manipulation, impulsive thrill-seeking, and a tendency to engage in antisocial behavior (Hare, 1985). Even those who have avoided being arrested tend to engage in dangerous and often illegal behaviors with little concern for the consequences (Paulhus & Williams, 2002).

One might expect a heightened tendency to cheat in all three characters, but little direct research is available. To date, the most attention has been given to possible links between Machiavellianism and cheating. The associations were found to be positive but small (Cizek, 1999; Flynn, Reichard, & Slane, 1987; Whitley, 1998).

Indirect evidence suggests that higher rates of scholastic cheating would not be surprising: All three of the Dark Triad have been linked to antisocial behavior (e.g., Baumeister, Bushman, & Campbell, 2000; Fehr et al., 1992; Hemphill, Hare, & Wong, 1998). For example, on an anonymous self-report measure of misbehavior, high scores on subclinical psychopathy (and, to a lesser extent, Machiavellianism) predicted higher rates of bullying, crime, and drug use (e.g., Nathanson, Paulhus, & Williams, in press). Behavioral evidence is less abundant, but laboratory studies have demonstrated deceptive behaviors among Machiavellians (Fehr et al., 1992). Similarly, recent behavioral evidence indicated that when provided with the opportunity to defraud a lottery, those high in subclinical psychopathy were more likely to do so (Paulhus, Williams, & Nathanson, 2002). Finally, the tendency of narcissists to over-claim academic knowledge (Paulhus, Harms, Bruce, & Lysy, 2003) suggests that they might also cheat on exams. In sum, the Dark Triad of narcissism, Machiavellianism, and subclinical psychopathy are all likely candidates for engaging in scholastic cheating.

1.4. Perfectionism

Although the perfectionist is also a likely candidate for cheating, there are no known published studies on this topic. Perfectionists are characterized by a drive to produce work that conforms to unrealistically high (and often unobtainable) standards. In academic settings, perfectionists should be especially motivated to obtain perfect scores on exams (Bieling, Israeli, Smith, & Antony, 2003) and, accordingly, may resort to drastic means such as cheating.

Three types of perfectionism have been distinguished: self-oriented, socially-prescribed, and other-oriented (Hewitt & Flett, 1991). Because *self-oriented perfectionism* is characterized by an internally-driven motivation to achieve perfection, we anticipate that it is most likely of the three to predict cheating. *Socially-prescribed perfectionism*, however, may also motivate cheating because high scorers feel that other people expect exemplary achievements from them. Given that *other-oriented perfectionism* is characterized by unrealistically high standards for others, we see no reason to anticipate above-average rates of cheating.

1.5. The Big Five dimensions

At present, the dominant model of personality trait structure is the "Big Five" (e.g., Costa & McCrae, 1992; John & Srivastava, 1999). They are five orthogonal dimensions held to capture the full range of personality traits. Extraversion is characterized by being talkative, outgoing, friendly, and prone to sensation-seeking. Agreeableness is characterized by cooperating with others, maintaining harmony, and being seen as a 'likable' person. Conscientiousness is characterized by a sense

of duty, responsibility, and orderliness. Emotional stability is characterized by being level-headed, well-adjusted, and able to deal with stress. Finally, Openness is characterized by autonomous, independent thinking, along with aesthetic and intellectual interests.

Despite a growing consensus about the importance of the Big Five dimensions of personality, only Extraversion and Neuroticism have received attention in the cheating literature. Results for Extraversion are equivocal: Cizek (1999) reported that, in three out of four studies, Extraversion showed a significant positive correlation with cheating. However, Jackson and colleagues recently obtained a negative, albeit weak, association between Extraversion and cheating (Jackson, Levine, Furnham, & Burr, 2002). Studies of Neuroticism have shown weak positive correlations with cheating (Cizek, 1999; see also Jackson et al., 2002). As far as we know, the roles of Openness to Experience and Agreeableness in cheating have yet to be studied; nor are there any obvious a priori predictions about those two dimensions.

Although Extraversion and Neuroticism have been given the most attention, the Big Five variable with the closest theoretical connection is low Conscientiousness. The published research is minimal but Conscientiousness has clear conceptual links with honesty (Emler, 1999). In a study conducted before the Big Five terms became popular Hetherington and Feldman (1964) showed that students low in trait responsibility were found to be more likely to cheat. Most compelling, abundant research conducted in industrial settings has shown that low conscientious individuals exhibit a persistent pattern of dishonest behaviors such as theft, absenteeism, and bogus claims of worker compensation (Hogan & Hogan, 1989).

1.6. The present research

In Study 1, we used two software indicators along with seating charts to diagnose cheating in several large classes. We also collected measures of a wide range of individual differences on the same students. We anticipated systematic associations between cheating and certain personality predictors. Study 2 was designed to replicate the results of Study 1 and show that the personality predictors held up even after controlling for scholastic competence.

2. Study 1

Based on the research reviewed earlier, we hypothesized that the "Dark Triad" of personality—Machiavellianism, narcissism, and subclinical psychopathy—would all be associated with an increased likelihood of cheating. In addition, we hypothesized significant associations of cheating with perfectionism (both self-oriented and socially-prescribed), and (low) conscientiousness. Finally, we predicted no differences in cheating based on the three available demographic variables (gender, major, and ethnicity).

2.1. Method

2.1.1. Participants

Participants were 770 students enrolled in three sections of introductory psychology at a large northwestern university. Sixty-five percent were women. The proportions by ethnic heritage were European (43%), Asian (38%), and other (19%). Proportions by major were science (38%), arts (33%), and other (29%). All students received extra course credit points for participation.

2.1.2. Procedure

Early in the course, the instructor requested biographical information including students' major, gender, and ethnic background. At that time, students were notified that the instructor would be watching for cheating on the exams. The university IRB agreed that this early warning provided a sufficient tradeoff of ethical concerns with methodological rigor and the potential value of the research to the university as a whole.

At various times during the course, students were given the opportunity to participate in other studies for extra marks. Out of the 770 students on which we had cheating scores, a total of 291 also chose to participate in a study where a large battery of self-report personality measures was administered.

The course evaluation procedure consisted of five multiple-choice exams. Teaching duties for the course were evenly divided between two course instructors, with one instructor teaching each term. Exams were not cumulative and administered at regular intervals throughout the duration of the course.

Students were allowed 60 min to complete the four 40-item midterm exams and 90 min to complete the 80-item final exams. Following the university tradition, students were free to choose where to sit. The instructor and five teaching assistants were present to administer and monitor each exam.

During each exam administration, detailed seating charts were collected by passing around a sign-up sheet. Students responded to exam questions on scantron bubble sheets. After each exam, the sheets were scanned and a computer file containing the responses was submitted to the S-Check program, which indicated possible cheating pairs.

2.1.3. Materials

2.1.3.1. *Big Five traits.* The Big Five personality traits were assessed with the Big Five Inventory (BFI; John & Srivastava, 1999). The BFI is a 44-item questionnaire in five-point Likert format (1 = 'Strongly disagree' to 5 = 'Strongly agree'). Example items (and the Big Five trait they assess) include "talkative" (Extraversion), "is considerate and kind to almost everyone" (Agreeableness), "does a thorough job" (Conscientiousness), "remains calm in tense situations" (Emotional Stability), and "values artistic, aesthetic experiences" (Openness).

John and Srivastava (1999) reported α reliabilities of at least .80 for all Big Five scales along with strong correlations with the longer, standard measure of the Big Five, Costa and McCrae's (1992) NEO-PI-R. The α values in our sample ranged from .79 to .87. They appear along with the αs for other scales on the diagonal of Table 1.

Table 1
Intercorrelations of personality predictors in Study 1

	1	2	3	4	5	6	7	8	9	10	11
1. Narcissism	(.87)	.25	.46	.37	−.24	.08	.23	.10	.23	.10	.19
2. Machiavellianism		(.79)	.58	−.15	−.57	−.32	−.14	−.06	.17	.26	.06
3. Subclinical psychopathy			(.89)	.05	−.46	−.23	.05	.05	−.08	.21	.07
4. Extraversion				(.87)	.06	.13	.26	.23	.10	.02	.15
5. Agreeableness					(.80)	.31	.19	.01	−.03	−.27	.00
6. Conscientiousness						(.80)	.14	.03	.31	−.16	.10
7. Emotional stability							(.83)	.12	−.08	−.12	.06
8. Openness to experience								(.79)	.10	.02	.07
9. Self-oriented perfectionism									(.87)	.34	.45
10. Socially-prescribed perfectionism										(.83)	.36
11. Other-oriented perfectionism											(.70)

Note. $N = 291$. Diagonal values represent α reliabilities. All $rs > .11$ are significant, $p < .05$. All $rs > .15$ are significant, $p < .01$ (both two-tailed).

2.1.3.2. Narcissism. Narcissism was assessed with the Narcissistic Personality Inventory (NPI; Raskin & Hall, 1979). The NPI contains 40 forced-choice items such as "I like to be the center of attention." vs. "I like to blend in with the crowd." In this example, endorsing the first option is considered indicative of narcissism.

Currently considered the standard measure of subclinical narcissism, the NPI has well-established psychometric properties (e.g., Raskin & Terry, 1988). These authors report an estimate of the α reliability of the NPI as .83. In our sample, the α was .87.

2.1.3.3. Machiavellianism. Machiavellianism was assessed with the Mach-IV (Christie & Geis, 1970). The measure is a 20-item questionnaire with a five-point Likert scale (1 = 'Strongly disagree' to 5 = 'Strongly agree'). Participants are asked to indicate their degree of agreement with such items as "Most people are basically good and kind" and "It is hard to get ahead without cutting corners here and there."

The Mach-IV has also been established as psychometrically sound (e.g., Christie & Geis, 1970; Wrightsman, 1991). α reliability scores average about .79, which was also the α in our sample.

2.1.3.4. Subclinical psychopathy. To assess subclinical psychopathy, we used the Self Report Psychopathy scale (SRP-III) (Paulhus, Hemphill, & Hare, in press). Based on the 'gold-standard' of clinical psychopathy assessment, the Psychopathy Checklist—Revised (PCL-R; Hare, 1991), the SRP-III is a 40-item measure that requires participants to indicate their agreement with the items on a five-point Likert scale (1 = 'Strongly disagree' to 5 = 'Strongly agree'). Items include "I get a kick out of

conning someone" and "It's fun to see how far you can push a person before they catch on."

The psychometric properties of the SRP-III have been demonstrated to be sound (Williams, Paulhus, & Hare, in press). For example, SRP-III scores have demonstrated strong convergent validity with other measures of subclinical psychopathy such as the Psychopathic Personality Inventory (Lilienfeld & Andrews, 1996) and the Levenson Self-Report Psychopathy scale (Levenson, Kiehl, & Fitzpatrick, 1995). In addition, SRP-III scores typically show α values well above .80. In our sample, we obtained an α of .89.

2.1.3.5. Perfectionism. Perfectionism was assessed with the Multidimensional Perfectionism Scale (MPS; Hewitt, Flett, Turnbull-Donovan, & Mikail, 1991). The MPS consists of 45 items in five-point Likert format (1 = 'Strongly disagree' to 5 = 'Strongly agree'). Some sample items include "I strive to be as perfect as I can be" (self-oriented perfectionism), "If I ask someone to do something, I expect it to be done flawlessly" (other-oriented perfectionism), and "People expect nothing less than perfection from me" (socially-prescribed perfectionism).

Hewitt et al. (1991) provide extensive evidence for the psychometric soundness of the MPS subscales. The authors report that α reliabilities for each subscale are above .70. In our sample, we obtained α reliabilities of .87, .83, and .70 for self-oriented, socially-prescribed, and other-oriented perfectionism scores, respectively.

2.2. Results

2.2.1. Identifying potential cheating pairs

For each of the five exams, the matrix of responses (participant by item) was submitted to the S-Check program. Based on a Zb cutoff of 4.0, 32 potential cheaters were identified: Overall, 4.2% of the students were members of a potential cheating pair. Among the latter, Zb scores ranged from 4.04 to 7.52, with an average of 5.31. All these values were higher than 99.9% of the distribution. A visual inspection of the Zb distributions (such as that illustrated in Fig. 1) confirmed that each identified pair or cluster of potential cheaters was a clear outlier.

To corroborate those results, we examined the Harpp–Hogan scores from S-Check. None of the potential cheating pairs showed Harpp–Hogan values less than 1.0: Specifically, they ranged from 1.00 to 19.00 with a mean of 4.23.

Next, we examined the seating charts for each exam sitting. For each pair or cluster identified as potential cheaters, the members turned out to be seated in immediate proximity to each other. Students identified and verified as cheaters were not confronted and remained enrolled in the course.[2]

---

[2] We did not prosecute pairs of students identified as cheaters. Specifically, our university does not yet consider being flagged on a cheating detection program such as S-Check sufficient, stand-alone evidence to conclusively accuse students of or prosecute them for cheating. For such events to occur additional corroborative evidence, typically the reports of proctors, are required. Given that for each exam across both studies the proctors were unable to detect any evidence of cheating, we did not feel justified in prosecuting those students flagged by S-Check.

2.3. Cheating index for individuals

Our primary dependent variable indicated whether or not a student was flagged by Wesolowsky's Zb index as part of a cheating pair on any of the exams. This index was dichotomously scored with 1 = 'Cheated at least once' and 0 = 'Never cheated.' Among the 32 potential cheaters, several were identified on multiple occasions. These data allowed us to compute a reliability estimate for the software indicators. Specifically, we correlated the cheating scores obtained across the first instructor's exams with those from the second instructor. This procedure yielded αs of .67 for both the Wesolowsky and the Harpp–Hogan indices.

2.4. Predictors of cheating

2.4.1. Demographic differences

We calculated the percentage of individuals flagged as cheaters within each demographic category: gender (5.2% of men; 3.6% of women); ethnicity (5.2% of Asian heritage students, 2.7% of European heritage students, 0.5% of others); major (4.4% of arts majors, 2.7% of science majors, and 1.4% of others). We then computed chi-square values to determine if there were significant differences between groups. Results suggested that there were no significant differences in cheating between the sexes, $\chi^2(1, N = 770) = 1.11$, ethnicities, $\chi^2(2, N = 770) = 3.01$, or majors, $\chi^2(2, N = 770) = 5.55$, all *ns*.

2.4.2. Personality predictors

Intercorrelations of the personality predictors are found in Table 1. As predicted, members of the Dark Triad were the best predictors of cheating. With our concrete index of cheating as the criterion, subclinical psychopathy was the strongest predictor, $r = .11$, $p < .01$, one-tailed. However, Machiavellianism ($r = .07$, $p < .05$, one-tailed), and narcissism ($r = .09$, $p < .01$, one-tailed) were not far behind.

Given the overlap among the Dark Triad variables (e.g., Paulhus & Williams, 2002), we included them as joint predictors of cheating in a multiple regression. As indicated in Table 2, psychopathy emerged as the sole significant predictor, $\beta = .17$, $p < .05$ (one-tailed).

Correlations of the remaining predictors with cheating are found in Table 3. None of our hypothesized predictors (self-oriented perfectionism, socially-prescribed perfectionism, and conscientiousness) were significant, even with one-tailed tests at

Table 2
Regression of cheating scores on the Dark Triad in Study 1 ($N = 291$)

Variable	B	SE B	β
Narcissism	.04 (.06)	.10 (.07)	.04 (.05)
Machiavellianism	−.01 (−.03)	.04 (.04)	−.03 (−.07)
Subclinical psychopathy	.05 (.07)	.03 (.02)	.17* (.25)

Note. $R^2 = .03$, $p < .05$. Values are in parentheses are disattenuated for unreliability in the criterion.
  * $p < .01$ (one-tailed).

Table 3
Correlations of other personality predictors with cheating in Study 1

	Behavioral index of cheating
Extraversion	−.02 (−.03)
Agreeableness	.03 (.04)
Conscientiousness	−.04 (−.06)
Emotional stability	.06 (.08)
Openness to experience	−.04 (−.05)
Self-oriented perfectionism	−.07 (−.09)
Socially-prescribed perfectionism	.03 (.04)
Other-oriented perfectionism	−.02 (−.03)

Note. $N = 291$. Values in parentheses are disattenuated for unreliability in the criterion.
None of these values are significant at $p < .05$ (two-tailed). None of the hypothesized predictors (conscientiousness, self-oriented perfectionism, and socially-prescribed perfectionism) were significant even at $p < .05$, one-tailed.

$p < .05$. We made no predictions about the rest of the personality variables: None were significant using two-tailed tests.

2.4.3. Disattenuated results

Even our significant correlations are in the small range according to Cohen's (1992) guidelines. Among the handicapping factors is the modest reliability of the cheating flag produced by S-Check: Recall that the α was only .67. To redress this limitation, we disattenuated the correlations using the equation provided by Cohen, Cohen, West, and Aiken (2002, p. 144). This formula corrects for unreliability in the criterion but not in the predictor.

The disattenuated values appear in parentheses in Tables 2 and 3. Even after disattenuating, the general pattern of results remained intact. For example, subclinical psychopathy remained the strongest predictor of cheating, $r = .14$, with the remaining Dark Triad constructs not far behind (narcissism: $r = .12$; Machiavellianism: $r = .09$). The unique effect of subclinical psychopathy became even more pronounced when the regression was conducted using the disattenuated values, $\beta = .25$, as indicated in Table 2. The other personality variables still showed minimal associations with cheating. The strongest association was with self-oriented perfectionism ($r = -.09$), but in the opposite direction to our prediction.

2.5. Discussion

Study 1 examined a range of personality and demographic predictors of naturalistic cheating in a large sample of students. Consistent with our hypotheses, we found no significant differences in cheating rates on any of the demographic variables. This result is in line with those of McCabe et al. (2001) who found no demographic differences in concrete behavioral indices of cheating. It appears that cheating rates vary little across major, gender and ethnicity.

Also in line with our hypotheses, the members of the Dark Triad—narcissism, Machiavellianism, and subclinical psychopathy—emerged as the best personality

predictors of cheating. When the overlap among the three variables was controlled, however, only subclinical psychopathy remained as an independent predictor. These results corroborate previous research indicating the superior predictive power of psychopathy relative to the other Dark Triad variables (e.g., Williams, McAndrew, Learn, Harms, & Paulhus, 2001). In particular, this finding adds objective, behavioral evidence to bolster the claim that psychopathy is the best personality predictor of anti-social behavior (e.g., Forth, Brown, Hart, & Hare, 1996; Hemphill et al., 1998; Williams & Paulhus, 2004).

Otherwise, our results were consistent with previous reviews (Cizek, 1999; Whitley, 1998), suggesting that personality variables are poor predictors of cheating. Before touting the efficacy of the Dark Triad and dismissing the Big Five traits, we decided to include them both in a replication study. A second study also allowed us to explore the role of scholastic competence.

3. Study 2

The possibility that subclinical psychopaths have poorer scholastic competence (e.g., ability, knowledge, and preparation) suggests an alternative explanation for their higher cheating rates: Students with less competence have more motivation to cheat. It is worth reviewing the evidence for this argument.

3.1. Scholastic competence and cheating

Three major reviews have addressed this topic. Whitley and Keith-Spiegel (2002) were pessimistic about any link between cognitive ability and cheating but Cizek (1999) concluded that there is a negative association. The most comprehensive review was recently conducted by Paulhus, Nathanson, and Williams (2005). Only behavioral indicators of cheating were considered but measures of ability included various IQ tests, SAT scores, and other aptitude tests. The results were quite consistent across 13 studies: in every case, cheating rates were higher in students with lower cognitive ability. The mean effect size was $-.26$.

Previous research has also indicated that cheating can be predicted from initial deficits in course-relevant knowledge (Whitley, 1998). For example, Leveque and Walker (1970) found that students with poorer grades in a previous geometry course were more likely to cheat on a test in a later geometry course.

Of course, prior knowledge should overlap with measures of cognitive ability (Brody, 1997; Lavin, 1965). Accordingly, any analyses conducted with both cognitive ability and prior knowledge as predictors will require controlling for their overlap.

3.2. Scholastic competence and psychopathy

Compared to the general population, clinically-defined psychopaths show deficits on intelligence tests (e.g., O'Kane, Fawcett, & Blackburn, 1996; Vitale, Smith, Brinkley, & Newman, 2002). The nature of the deficit might be traced to relatively low verbal vs. per-

formance scores (Dolan & Anderson, 2002). Evidence of a similar pattern in subclinical samples has also been reported (Paulhus & Williams, 2002). These findings all converge on the conclusion that, even in educated samples, individuals with psychopathic tendencies may show, if not a deficit, then a distinctive pattern of cognitive abilities.

To date, there are no comparable studies on background preparation. However, given the irresponsible nature of both clinically-defined (Harpur, Hart, & Hare, 2002) and sub-clinically defined psychopaths (Williams et al., in press), we anticipate a corresponding deficit in prior knowledge among students scoring high on subclinical psychopathy.

3.3. The present research

To address these issues, we conducted a study similar to Study 1 but extended it to include measures of scholastic competence, namely, a prior knowledge test and two standard cognitive ability tests. We expected to replicate the pattern of associations between personality and cheating found in Study 1. In addition, we hypothesized that students with deficits in scholastic competence would show higher cheating rates. Finally, we aimed to determine the extent to which poor scholastic competence explains the link between psychopathy and cheating.

3.4. Method

3.4.1. Participants
Participants were 250 students enrolled in two second-year undergraduate classes at a large northwestern university. Sixty-two percent of participants were women. Forty-five percent were of Asian heritage, 32% were of European heritage, and the rest from other ethnic heritages. Forty-seven percent of participants were arts majors, 34% were science majors, and the remainder were scattered across other majors.

Of the 250 students enrolled, 150 completed the battery of personality, ability, and prior knowledge measures. All participants received extra marks for participation. We had no reason to believe that that the students who completed the test battery differed from those who did not. Even if they were, any such difference would act to restrict the range of our personality variables, and thereby reduce the size of the obtained correlations. Such a scenario would mean that the results we report are actually conservative estimates.

3.4.2. Procedure
The grading in both courses consisted of two (exclusively multiple-choice) exams: a midterm and a final exam. As in Study 1, these exams were the only source of grades for these courses: they were not cumulative and therefore were independent measures. Detailed seating charts were collected for both exams. The midterm, given roughly at the halfway point of the course, consisted of 40 multiple-choice questions and students were allowed 50 min for completion. Three proctors, including the instructor, were present. The final exam consisted of 80 multiple-choice questions. The instructor and four other proctors were present and students were given 90 min to finish.

The collection of biographical, personality, and cheating information was highly similar to that in Study 1. The cognitive ability measures were collected as part of an ongoing lab study.

3.4.3. Materials

3.4.3.1. Cognitive ability measures. Participants were administered one of two cognitive ability measures. The Wonderlic Personnel Test (Wonderlic, 1983) contains 50 items drawn from verbal, quantitative, and analytic content areas. Although participants are allowed only 12 min for completion, the Wonderlic behaves like a power test because items are presented in ascending order of difficulty. We computed separate scores for verbal ability and non-verbal (i.e., quantitative and analytic) ability.

The reliability and validity of the Wonderlic have been amply demonstrated in previous research (e.g., Dodrill, 1981; Paulhus, Lysy, & Yik, 1998). For example, scores on the Wonderlic have shown strong test–retest correlations ranging from .82 to .94 (Geisinger, 2001) and convergent validity with scores on longer tests of cognitive ability, such as the WAIS-R (Schraw, 2001).

The second ability test was based on the Quick Word Test (QWT; Borgatta & Corsini, 1964), a 100-item power vocabulary test. In the past, the QWT has shown strong convergent validity with other standard intelligence tests such as the WAIS (Bass, 1974; Glynn, Okun, Muth, & Britton, 1983). Internal consistency estimates on the full test average .91.

The items were updated and the revision was called the UBC Word Test (Paulhus, 2003). Most stems are five letters in length and respondents are asked to select the best synonym from four choices. We set a fixed administration limit of 8 min. To control for variation in the number attempted, we calculated scores as the ratio of correct answers to questions answered. In our sample, despite the imposed time limit, we obtained an α reliability of .73 as measured via the odd–even method.

3.4.3.2. Psychology knowledge pretest. At the beginning of the course, students were administered a pretest of prior knowledge in psychology. The pretest comprised 25 multiple-choice items from a variety of content areas in psychology. Items with difficulty ratings of low to moderate were selected from various study books. By choosing items with these difficulty levels, we sought to ensure that our pretest tapped knowledge of psychology rather than "ignorance" of advanced knowledge (Furnham & Rawles, 1993). Administration took roughly 20 min with items presented on an overhead screen while being read aloud. The α reliability for this measure was .56.

3.4.3.3. Subclinical psychopathy. Subclinical psychopathy was assessed by the Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996). The PPI is a 187-item self-report measure that employs a five-point Likert scale. Participants are asked to indicate their degree of agreement with such items as "I generally prefer to act first and think later" and "I tell many 'white lies.'"

Previous studies have demonstrated strong convergent validity between the PPI and the SRP-III (Williams et al., in press) as well as with other measures of psychop-

athy (see Poythress, Edens, & Lilienfeld, 1998). Lilienfeld and Andrews (1996) reported α reliabilities that are consistently well above .80. In our sample, we obtained an α of .92.

3.5. Results and discussion

3.5.1. Identifying potential cheating pairs

As in Study 1, the matrix of responses for each exam (participant by item) was submitted to S-Check. On the midterm exam, an examination of Zb scores identified three potential potential cheating pairs. On the final exam, the program identified a single cluster of four students. For these cheating groups, Zb scores were all found to be high, ranging from 4.68 to 7.68 with an average of 6.21. All these scores exceeded 99.99% of the distribution. All cheating pairs were corroborated by Harpp–Hogan similarity coefficients >1.0.

A visual inspection of the Q–Q plot confirmed that the six flagged clusters were clear outliers on the distribution of Zb scores. Moreover, our seating charts indicated that members of each cluster were all seated in close proximity. In total, then, the program indicated that 10 students, or 4.0% of the sample, were implicated in cheating on at least one exam.

As in Study 1, our dependent variable for individuals was a dichotomous cheating index. Those who cheated on either exam (or both), were assigned a score of '1'; others received a score of '0.'

3.5.2. Predictors of cheating

We again looked at the percentages within each demographic category who were flagged as cheaters: gender (3.2% of men; 4.5% of women); ethnicity (6.2% of Asian heritage students, 1.3% of European heritage students, and 3.5% other); major (5.9% of arts majors, and 3.5% of science majors). And, again, we computed chi-square values to see if there were demographic differences in rates of cheating. Results indicated no significant differences in cheating between the sexes, $\chi^2(1, N = 250) = .28$, ethnicities, $\chi^2(2, N = 250) = 1.85$, or majors, $\chi^2(2, N = 250) = 3.15$, all $p = ns$, respectively. These results matched those of Study 1 and provide further evidence that individual differences in cheating are not well explained by demographic variables.

Recall that our participants completed one of two measures of cognitive ability—the Wonderlic Personnel Test or the UBC Word Test. To combine the two groups, we standardized each measure and then pooled the whole sample. The intercorrelations of the scholastic competence and personality predictors along with their α reliabilities are found in Table 4.

3.5.3. Personality predictors

Results largely replicated those of Study 1, with effect sizes similar to those obtained in Study 1. Subclinical psychopathy again emerged as the strongest predictor of cheating, $r = .24$, $p < .01$ (one-tailed). Although the correlations of Machiavellianism and narcissism with cheating showed trends in the positive direction, both

Table 4
Intercorrelations of personality and scholastic competence predictors in Study 2

	1	2	3	4	5	6	7	8	9	10	11
1. Narcissism	(.84)	.23	.52	.56	−.19	.10	.17	.25	−.05	−.03	−.08
2. Machiavellianism		(.73)	.50	.04	−.41	−.25	−.13	−.05	−.05	−.11	−.20
3. Subclinical psychopathy			(.92)	.39	−.38	−.36	.22	.13	−.06	−.11	−.17
4. Extraversion				(.88)	.05	.23	.26	.27	−.06	−.02	−.03
5. Agreeableness					(.78)	.25	.30	.08	.08	.08	.13
6. Conscientiousness						(.81)	.22	.04	.14	.17	.14
7. Emotional stability							(.86)	.15	.20	.20	.11
8. Openness to experience								(.82)	−.04	.05	−.01
9. Overall cognitive ability									(.83)	.87	.26
10. Verbal ability										(.73)	.31
11. Course knowledge pretest											(.56)

Note. $N = 150$. Diagonal values represent α reliabilities. All $rs > .16$ are significant, $p < .05$. All $rs > .19$ significant, $p < .01$ (both two-tailed).

Table 5
Regression of cheating scores on the Dark Triad in Study 2 ($N = 150$)

Variable	*B*	*SE B*	β
Narcissism	−.06 (−.13)	.10 (.10)	−.06 (−.12)
Machiavellianism	−.02 (−.05)	.04 (.04)	−.04 (−.10)
Subclinical psychopathy	.22 (.33)	.08 (.09)	.29** (.43)

Note. $R^2 = .07$, $p < .05$. Disattenuated values are in parentheses. Disattenuated $R^2 = .11$.
** $p < .01$ (one-tailed).

$r = .09$, they were only marginally significant. As seen in Table 5, when the Dark Triad variables are entered into a multiple regression predicting cheating, psychopathy is again the strongest predictor, $\beta = .29$, $p < .01$ (one-tailed).

Correlations with the remainder of the predictors in Study 2 with cheating are provided in Table 6. The correlation with Conscientiousness was in the predicted direction, $r = −.09$, but only marginally significant, $p < .08$ (one-tailed).

3.5.3.1. Scholastic competence. The tabled results supported our hypothesis in that overall cognitive ability (i.e., the combination of verbal and non-verbal ability) predicts cheating, $r = −.14$, $p < .05$ (one-tailed). We created a purer index of verbal ability by standardizing Wonderlic verbal scores and then pooling them with standardized scores on the UBC Word Test. As might be expected, the correlation of cheating with verbal ability was even stronger, $r = −.22$, $p < .01$ (one-tailed). In addition, cheating was negatively associated with course pretest scores, $r = −.12$, although this value was only marginally significant, $p < .09$.

3.5.3.2. Independent effects of psychopathy. To determine whether the relation between psychopathy and cheating is independent of verbal ability and prior knowledge, we regressed cheating simultaneously on all three predictors. As indicated in Table 7,

Table 6
Correlations of predictors with cheating in Study 2

	Behavioral index of cheating
Personality predictors	
Extraversion	.10 (.13)
Agreeableness	−.07 (−.10)
Conscientiousness	−.09 (−.12)
Emotional stability	.03 (.04)
Openness to experience	−.13 (−.18)
Scholastic competence predictors	
Overall cognitive ability	−.14* (−.19)
Verbal ability	−.22 * (−.32)
Course pretest	−.12 (−.20)

Note. $N = 150$. None of the unpredicted variables are significant at $p < .05$ (two-tailed). Values in parentheses are the correlations after disattenuation.
  * $p < .05$ (one-tailed).

Table 7
Regression of cheating scores on academic competence and subclinical psychopathy in Study 2 ($N = 150$)

Variable	B	$SE\ B$	β
Verbal ability	−.03 (−.05)	.02 (.02)	−.19** (−.27)
Knowledge pretest	.00 (.00)	.01 (.01)	−.03 (.00)
Subclinical psychopathy	.16 (.20)	.06 (.06)	.22** (−.27)

Note. $R^2 = .10$, $p < .01$. Disattenuated values are in parentheses. Disattenuated $R^2 = .17$.
  ** $p < .01$ (one-tailed).

although verbal ability remained predictive of cheating, $\beta = -.19$, $p < .01$ (one-tailed), psychopathy emerged as the strongest predictor, $\beta = .22$, $p < .01$ (one-tailed).

3.5.3.3. Disattenuated results. As in Study 1, many of the observed correlations were hampered by the unreliability of the measures involved. Accordingly, we disattenuated the correlations between our predictors and cheating: those values are reported in parentheses in Table 6. Although many of the disattenuated correlations remained small, the effects of several key variables increased to moderate levels of effect size. Specifically, subclinical psychopathy remained among the strongest predictors, $r = .31$. Associations with narcissism, $r = .12$, and Machiavellianism, $r = .13$, improved but were still comparatively weak. Along with subclinical psychopathy, the effect of verbal ability on cheating became especially pronounced, $r = -.32$. In addition, multiple regressions conducted with these disattenuated correlations yielded identical conclusions to those conducted with the raw, attenuated correlations (see Tables 5 and 7).

4. General discussion

Using a concrete behavioral indicator of cheating, we found evidence from two large studies that individual differences in personality and scholastic competence play

a role, but demographic factors do not. Specifically, high scores on subclinical psychopathy and low scores on scholastic ability appear to predispose students to cheat.

In several ways, our findings confirm the utility of computer software indicators of cheating. First, the two software indicators converged to provide assurance that the flagged pairs of students were indeed potential cheating dyads. Moreover, in every case where the software indicated excessive answer similarity, our seating charts confirmed that the flagged students were sitting adjacent to each other during the exam. In short, our software indicators produced reliable and convergent lines of evidence across two independent studies.

Our use of a concrete measure avoided the limitations of self-report measures and captured naturalistic rates of cheating. Across our two studies, the rates of cheating were virtually identical, specifically 4.2% (Study 1) and 4.0% (Study 2). These rates may seem low compared to previous estimates based on self-report (Newstead et al., 1996), which are upwards of two-thirds of students (Robinson et al., 2004; Stern & Havlicek, 1986). Those self-report measures, however, cover a wider scope and time: typically, they ask whether a student has cheated at any time during his/her schooling. They also include all varieties of cheating. In contrast, our coverage was restricted to a few discrete opportunities to copy multiple choice exam responses in one college course.

Note that our ability to find significant correlates of cheating was hampered by two methodological handicaps. First, the low cheating rates obtained in a naturalistic study make it more difficult to obtain statistically significant results (Cohen et al., 2002). Studies using entrapment setups can produce far higher rates of cheating, and so can self-reports of lifetime cheating. However, the 4–5% rates that we obtained better represent typical rates of cheating per opportunity (Lavin, 1965).

The second handicap with our software method is that it yields a cheating dyad,[3] not an individual cheater. Nonetheless, we flagged both individuals as potential cheaters. Therefore, our significant positive correlations actually indicate that the average psychopathy score of those in flagged dyads is higher than the average psychopathy score of those not flagged by the program. In fact, although both members may indeed be psychopathic, it is more likely than one participant, the "cheater," is taking advantage of the "cheatee." Hetherington and Feldman (1964) coined the labels *active cheater* and *passive cheater*. But the latter term implies some participation, which, in the case of our dyads, cannot be determined.[4] The point here is that our results would have been even stronger had we been able to identify and count only the active cheaters.

Despite these two statistical handicaps, we were able to demonstrate significant effects of verbal ability and subclinical psychopathy—effects that are particularly pronounced after disattenuation. The significance of these two effects despite these handicaps suggests that, in fact, our effect sizes are conservative estimates.

---

[3] In one case, there were four in a cluster of apparent cheaters.

[4] In a recent paper, the term "passive cheater" was used differently to mean students who overheard the correct answers to exam questions (Ahlers-Schmidt & Burdsal, 2004).

We now consider details concerning both the successful and unsuccessful predictors.

4.1. Predictors of cheating

4.1.1. Scholastic competence

Study 2 demonstrated that students with deficits in scholastic competence are more likely to cheat. The finding confirms earlier research suggesting that poor scholastic competence—whether lack of raw ability (Cizek, 1999; Paulhus et al., 2005) or lack of preparation (Whitley, 1998)—puts students in a difficult position that creates a need to cheat. Rather than overall cognitive ability, our results suggest that poor verbal ability may be the problem. Poor verbal ability would also tend to hamper course performance by hampering prior knowledge (Nathanson, Paulhus, & Williams, 2004). Students with low verbal ability, then, are doubly disadvantaged by this deficit: they would therefore be doubly motivated to use cheating to compensate. Future researchers should aim to replicate this finding in their own data.

4.1.2. Personality

Reviews of the role of personality in cheating have suggested surprisingly little impact (Cizek, 1999; Whitley & Keith-Spiegel, 2002). To some extent, our results confirm that conclusion. Of particular importance is the failure of the Big Five personality traits to show significant associations. Our only hypothesis about the Big Five was that conscientious individuals would cheat less. Although in the direction of the hypothesis, the associations were marginal in significance and small in effect size ($r = -.04, -.09$).

The rationale for our hypothesis was that conscientious students tend to be better prepared and, therefore, have less need to cheat (Hogan & Hogan, 1989). Note however, that conscientiousness also has a strong ambition component (Costa & McCrae, 1999). This desire to excel may motivate some conscientious individuals to cut corners, no matter how well-prepared they are. In short, conscientiousness combines two components that work in opposite directions: the net result may have been minimal because of this canceling effect. Future research should take advantage of measures that disentangle these two components.

Contrary to our hypotheses, neither form of perfectionism—self-oriented or socially-prescribed—was associated with cheating. Also disappointing were the results obtained for narcissism. Machiavellianism did show a consistent, albeit small, association with cheating—$r = .07$ in Study 1 and $r = .09$ in Study 2. This association vanished when included in a regression equation along with subclinical psychopathy. Although often predicted, the empirical association of Machiavellianism with actual cheating behavior has proved to be surprisingly weak (Christie & Geis, 1970; Cizek, 1999; Flynn et al., 1987). Lacking the impulsive tendency of psychopaths, Machiavellians may be more deliberate in their mischief and more attentive to possible negative consequences.

4.1.3. Subclinical psychopathy

Of the many personality variables assessed in this research, subclinical psychopathy emerged as the strongest predictor of scholastic cheating. It was even more successful than the other constructs in the Dark Triad, that is, narcissism and Machiavellianism. The independent effects of psychopathy, as indexed by regression coefficients (betas = +.17, +.29) fall in the small to moderate range according to guidelines laid out by Cohen (1992). Nonetheless, these associations appear to be the strongest links found to date between personality and actual cheating behavior. Subclinical psychopathy appears to be a singular exception to the rule that personality plays no role in explaining cheating.

The two studies presented here bolster our previous research on the dire nature of subclinical psychopathy (e.g., Nathanson et al., in press; Paulhus & Williams, 2002; Paulhus et al., in press; Williams & Paulhus, 2004; Williams et al., 2001). Our results with a concrete criterion are consistent with previous research linking cheating to a broader tendency to engage in illegal, antisocial, and generally offensive behaviors. The notion of a common factor was raised recently by Blankenship and Whitley (2000) when they found that scholastic cheaters were also likely to engage in a wide variety of antisocial behaviors including drug use and violence.

But exactly what makes cheating so prevalent among those high in subclinical psychopathy? Some insight may emerge from the distinction between the personality and behavioral components of psychopathy (Harpur et al., 2002). Evidence that implicates the *behavioral factor* of psychopathy comes from studies linking cheating to constructs such as low self-restraint (Jensen et al., 2002) and low self-control (Bolin, 2004; Cochran, Wood, Sellers, Wilkerson, & Chamblin, 1998). The impulsivity explanation suggests that the cheating is unplanned. It may indulge an immediate desire—in this case to pass an exam. Psychopaths may lack the foresight to anticipate possible negative consequences (e.g., embarrassment from getting caught, automatic exam failure, and expulsion). The thrill-seeking aspect, also associated with the first factor of psychopathy, suggests that cheating may indulge a desire to flirt with danger. If so, psychopaths might cheat even without any particular interest in scholastic success.

Involvement of the second factor of psychopathy, *callous personality*, suggests that cheaters may lack concern with the repercussions of getting caught. Rather than being unable to recognize the consequences of cheating, psychopaths may simply not care. Arguably, this component is the most troubling. To the extent that those high in subclinical psychopathy are unconcerned with the repercussions of getting caught, then warning or alerting them will prove futile in reducing their tendency to cheat. This component also suggests that such individuals lack empathy towards other students who may feel that their hard work and preparation for the exam is being undermined by cheaters. That is, with respect to cheating, the callous affect of those high in subclinical psychopathy may function on a more interpersonal than intrapersonal level.

Even worse, the two components of subclinical psychopathy form a synergistic combination (Hare, 1991). The impulsive thrill-seeker who disregards consequences and is unconcerned with the feelings of others is a likely candidate to engage in scholastic cheating if the motivation is there.

Recall that our measures of subclinical psychopathy (the SRP-III and PPI) are scored relative to the current sample and assess subclinical psychopathy as a *continuous* construct. We do not wish to imply that participants who scored highest in our sample are equivalent to or will eventually become psychopaths at the clinical or forensic level. For example, although much behavior typical of many adolescent males is also typical of those high in subclinical psychopathy, many of these males will eventually grow out of this behavior. Unfortunately this statement is not true of *all* adolescent males.

5. Future directions and recommendations

5.1. Behavioral indicators

Our findings suggest recommendations for both educators and researchers of cheating behavior. Both groups can benefit from use of concrete, objective criteria such as the two software indicators used here.

Researchers are justifiably concerned about the biases inherent in self-report measures—especially those that assess socially undesirable behaviors such as cheating (Paulhus, 1991). Individuals who admit to cheating will also admit to undesirable personalities: Spurious correlations are the result. Software indices are more objective, unobtrusive, and can be used to capture cheating at naturalistic rates in naturalistic settings.

Of course, answer copying on multiple choice exams is just one form of cheating. Our future research will address essay plagiarism as indexed by such measures as the Turn-It-In program (see Turnitin.com website). That program compares a submitted essay to a databank of essays collected from various sources, for example, mainstream journals—or even essays submitted by the instructor's previous classes. The program output includes a percentage index of plagiarism as well as details of the source of the copied material. We suspect that our two best predictors, low verbal ability and subclinical psychopathy, will again be the best predictors of that index of scholastic cheating.

Wide open for future research is the interpersonal process that leads one student to copy from another student. As with most methods of cheating identification, our method could not distinguish between the copier and the source. Both students could be cheating or just one—but which one? We are now pursuing the question of what combination of situations and personalities produces a cheating dyad. Direct interviews with the student-pairs implicated by software indicators, if conducted under guarantee of anonymity and impunity, might be fruitful. Another possibility is to collect indirect reports of who cheated by a follow-up survey asking students such questions as "Has anyone ever cheated off you?" By comparing each student's answers against the results from a cheating detection program, we might begin to uncover the interpersonal dynamics behind both active and passive cheaters. Another possibility is to pursue recent claims that statistical properties of exam responses might distinguish the cheater and cheatee (van der Linden & Sotaridona, in press).

5.1.1. Implications for educators

Educators are more directly concerned about minimizing cheating and, when it occurs, about identifying the perpetrators (Whitley & Keith-Spiegel, 2002). The increased accessibility of programs such as S-Check will help overcome some of the problems with traditional techniques. When suspicious behavior has been noted during an exam, for example, confirmation of excessive similarity with computer software is an invaluable tool. In fact, simply publicizing the fact that such techniques are in use should reduce the prevalence of cheating on any given exam.

Effecting improvements in students' cognitive ability and character is a more challenging goal: To the extent such changes are even possible, they seem beyond the mandate of the typical educator. Instead, we suggest that a preventative approach to cheating is more likely to be fruitful. Techniques for the prevention of cheating have been detailed by Cizek (1999) as well as Whitley and Keith-Spiegel (2002): They include alternate forms, randomly ordering the questions for each student, or, as suggested above, clearly warning about the use of cheating detection programs.

More generally, educators should benefit from awareness that the most probable cheaters are those low in scholastic competence and high in subclinical psychopathy. Awareness of the first group suggests redoubling efforts to prevent students from falling behind. Another approach may be to reduce the degree of competitiveness among the students. That is, by creating an environment where relative achievement is de-emphasized, the disadvantaged students would feel less threatened and may not resort to cheating.

Dealing with those high in subclinical psychopathy, on the other hand, is more of a challenge. The emergence of subclinical psychopathy as the primary predictor of cheating is intriguing but somewhat disturbing. The fact that cheating is just one in their history of antisocial behaviors suggests that subclinical psychopaths top the 'most likely to be expelled' list. Yet early diagnosis and surveillance of such individuals raises a host of practical and ethical controversies. For example, it seems unlikely that school boards and university senates would approve of mass pre-screening of students for psychopathy. Any attempt to determine probability-of-expulsion in advance suggests an unsavory "guilty until proven innocent" approach toward the students.

Even if pre-screening were to be approved, there is no established cutoff score for subclinical psychopathy. Although some researchers have argued that subclinical psychopaths form a distinct group in student samples (Book & Quinsey, 2004), most argue that subclinical psychopathy is a normally distributed variable (Lilienfeld & Andrews, 1996; Paulhus et al., in press). Either way, the diagnosis of psychopathy in a subclinical population is a comparatively more subjective endeavor than that in a clinical or forensic context. Even if scores were kept confidential, mislabeling could be extremely harmful to the student. The surveillance of high scoring individuals would be highly problematic ethically and practically. Indeed, it is possible that such labels might translate into self-fulfilling prophecies.

Note that deficits in positive motivations have been linked to cheating (Anderman, Griesinger, & Westerfield, 1998; Murdock, Hale, & Weber, 2001). However, there is no reason to believe that subclinical psychopaths suffer deficits in positive

motivational factors. As much as non-psychopaths, they are ambitious, believe in their ability to succeed at scholastic tasks and are internally motivated (Williams, Trapnell, & Paulhus, 2004). In sum, our character analysis suggests that the only way to eliminate cheating among psychopaths is to make cheating an impossibility.

The irredeemable nature of clinical and forensic psychopathy is well known (Hare, 1991). The degree to which this attribute applies to those high in (the more moderate) subclinical psychopathy is unstudied. Our current character analysis suggests similar pessimism because threats of punishment are likely to go unheeded. Instead, the possibility of impulsive cheating should be reduced as much as possible.

References

Ahlers-Schmidt, C. R., & Burdsal, C. (2004). Passive cheating in back-to-back classes. *Teaching of Psychology, 31*, 108–109.

Anderman, E. M., Griesinger, T., & Westerfield, G. (1998). Motivation and cheating during early adolescence. *Journal of Educational Psychology, 90*, 84–93.

Bass, B. (1974). Validity of Borgatta and Corsini's Quick Word Test with young adults. *Psychological Reports, 34*, 726.

Baumeister, R. F., Bushman, B. J., & Campbell, W. K. (2000). Self-esteem, narcissism, and aggression: Does violence result from low self-esteem or from threatened egotism? *Current Directions in Psychological Science, 9*, 26–29.

Bieling, P. J., Israeli, A., Smith, J., & Antony, M. M. (2003). Making the grade: The behavioral consequences of perfectionism in the classroom. *Personality and Individual Differences, 35*, 163–178.

Blankenship, K. L., & Whitley, B. E., Jr. (2000). Relation of general deviance to academic dishonesty. *Ethics and Behavior, 10*, 1–12.

Bolin, A. U. (2004). Self-control, perceived opportunity, and attitudes as predictors of academic dishonesty. *Journal of Psychology: Interdisciplinary and Applied, 138*, 101–114.

Book, A. S., & Quinsey, V. L. (2004). Psychopaths: Cheaters or warrior-hawks? *Personality and Individual Differences, 36*, 33–45.

Borgatta, E. F., & Corsini, R. J. (1964). *Quick Word Test manual.* New York: Harcourt, Brace, and World Inc..

Brody, N. (1997). Intelligence, schooling, and society. *American Psychologist, 52*, 1046–1050.

Christie, R., & Geis, F. L. (1970). *Studies in Machiavellianism*. New York: Academic Press.

Cizek, G. J. (1999). *Cheating on tests: How to do it, detect it, and prevent it*. Mahwah, NJ: Erlbaum.

Cochran, J. K., Wood, P. B., Sellers, C. S., Wilkerson, W., & Chamblin, M. B. (1998). Academic dishonesty and low self-control: An empirical test of a general theory of crime. *Deviant Behavior, 19*, 227–255.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*, 155–159.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. A. (2002). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Hillsdale, NJ: Erlbaum.

Costa, P. T., Jr., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI): Professional manual*. Odessa, FL: Psychological Assessment Resources.

Costa, P. T., Jr., & McCrae, R. R. (1999). Six approaches to the explication of facet-level traits: Examples from conscientiousness. *European Journal of Personality, 12*, 117–134.

Dodrill, C. B. (1981). Long term reliability of the Wonderlic Personnel Test. *Journal of Consulting and Clinical Psychology, 51*, 316–317.

Dolan, M., & Anderson, I. M. (2002). Executive and memory function and its relationship to trait impulsivity and aggression in personality disordered offenders. *Journal of Forensic Psychiatry, 13*, 503–524.

Dwyer, D. J., & Hecht, J. B. (1996). Using statistics to catch cheaters: Methodological and legal issues for student personnel administrators. *NASPA Journal, 33*, 125–135.

Emler, N. (1999). Moral character. In V. J. Derlaga, B. A. Winstead, & W. H. Jones (Eds.), *Personality: Contemporary theory and research* (pp. 377–404). Chicago: Nelson-Hall.

Fehr, B., Samsom, D., & Paulhus, D. L. (1992). The construct of Machiavellianism: Twenty years later. In C. D. Spielberger & J. N. Butcher (Eds.), *Advances in personality assessment* (Vol. 9, pp. 77–116). Hillsdale, NJ: Erlbaum.

Flynn, S., Reichard, M., & Slane, S. (1987). Cheating as a function of task outcome and Machiavellianism. *Journal of Psychology, 121*, 423–427.

Forth, A. E., Brown, S. L., Hart, S. D., & Hare, R. D. (1996). The assessment of psychopathy in male and female noncriminals: Reliability and validity. *Personality and Individual Differences, 20*, 531–543.

Frary, R. B. (1993). Statistical methods of detecting multiple-choice answer copying: Review and commentary. *Applied Measurement in Education, 6*, 153–165.

Frary, R. B., & Tideman, T. N. (1997). Comparison of two indices of answer copying and development of a spliced index. *Educational and Psychological Measurement, 57*, 20–32.

Furnham, A., & Rawles, R. (1993). What do prospective psychology students know about the subject? *Psychologia: An International Journal of Psychology in the Orient, 36*, 241–249.

Geisinger, K. F. (2001). Review of the Wonderlic Personnel Test and scholastic level exam. In B. S. Plake & J. C. Impara (Eds.), *The fourteenth mental measurements yearbook* (pp. 1360–1363). Lincoln, NE: The Buros Institute of Mental Measurements.

Glynn, S. M., Okun, M. A., Muth, K., & Britton, B. K. (1983). Adults' text recall: An examination of the age-deficit hypothesis. *Journal of Reading Behavior, 15*, 31–41.

Hare, R. D. (1985). Comparison of procedures for the assessment of psychopathy. *Journal of Consulting and Clinical Psychology, 53*, 7–16.

Hare, R. D. (1991). *The psychopathy checklist-revised.* Toronto/Buffalo: Multi Health Systems.

Harpp, D. N., & Hogan, J. J. (1993). Crime in the classroom: Detection and prevention on cheating on multiple-choice exams. *Journal of Chemical Education, 70*, 306–311.

Harpp, D. N., Hogan, J. J., & Jennings, J. S. (1996). Crime in the classroom part II. An update. *Journal of Chemical Education, 73*, 349–351.

Harpur, T. J., Hart, S. D., & Hare, R. D. (2002). Personality of the psychopath. In P. T. Costa & T. A. Widiger (Eds.), *Personality disorders and the Five-Factor Model of personality* (2nd ed., pp. 299–324). Washington, DC: American Psychological Association.

Hemphill, J. F., Hare, R. D., & Wong, S. (1998). Psychopathy and recidivism: A review. *Legal and Criminological Psychology, 3*, 139–170.

Hetherington, E. M., & Feldman, S. E. (1964). College cheating as a function of subject and situational variables. *Journal of Educational Psychology, 55*, 212–218.

Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality and Social Psychology, 60*, 456–470.

Hewitt, P. L., Flett, G. L., Turnbull-Donovan, W., & Mikail, S. F. (1991). The Multidimensional Perfectionism Scale: Reliability, validity, and psychometric properties in a psychiatric sample. *Psychological Assessment, 3*, 464–468.

Hogan, J., & Hogan, R. (1989). How to measure employee reliability. *Journal of Applied Psychology, 74*, 273–279.

Jackson, C. J., Levine, S. Z., Furnham, A., & Burr, N. (2002). Predictors of cheating behavior at a university: A lesson from the psychology of work. *Journal of Applied Social Psychology, 32*, 1031–1048.

Jensen, L. A., Arnett, J. J., Feldman, S. S., & Cauffman, E. (2002). It's wrong, but everybody does it: Academic dishonesty among high school and college students. *Contemporary Educational Psychology, 27*, 209–228.

John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 102–138). New York: Guilford.

Lavin, D. E. (1965). *The prediction of academic performance: A theoretical analysis and review of research.* New York: Sage.

Levenson, M. R., Kiehl, K. A., & Fitzpatrick, C. M. (1995). Assessing psychopathic attitudes in a noninstitutionalized population. *Journal of Personality and Social Psychology, 68*, 151–158.

Leveque, K. L., & Walker, R. E. (1970). Correlates of high school cheating behavior. *Psychology in the Schools, 7*, 159–163.

Lilienfeld, S. O., & Andrews, B. P. (1996). Development and preliminary validation of a self-report measure of psychopathic personality traits in noncriminal populations. *Journal of Personality Assessment, 66*, 483–524.

Lobel, T. E., & Levanon, I. (1988). Self-esteem, need for approval, and cheating behavior in children. *Journal of Educational Psychology, 80*, 122–123.

McCabe, D. L., & Trevino, L. K. (1996). What we know about cheating in college: Longitudinal trends and recent developments. *Change, 28*, 31.

McCabe, D. L., Trevino, L. K., & Butterfield, K. D. (2001). Cheating in academic institutions: A decade of research. *Ethics and Behavior, 11*, 219–232.

Murdock, T. B., Hale, N. M., & Weber, M. J. (2001). Predictors of cheating among early adolescents: Academic and social motivators. *Contemporary Educational Psychology, 26*, 96–115.

Nathanson, C., Paulhus, D. L., & Williams, K. M. (2004). The challenge to cumulative learning: Do introductory courses actually benefit advanced students?. *Teaching of Psychology, 31*, 5–9.

Nathanson, C., Paulhus, D. L., & Williams, K. M. (in press). Personality predictors and misbehavior correlates of body modification: Markers of cultural deviance? *Journal of Research in Personality*.

Newstead, S. E., Franklyn-Stokes, A., & Armstead, P. (1996). Individual differences in student cheating. *Journal of Educational Psychology, 88*, 229–241.

O'Kane, A., Fawcett, D., & Blackburn, R. (1996). Psychopathy and moral reasoning: Comparison of two classifications. *Personality and Individual Differences, 20*, 505–514.

Paulhus, D. L. (1991). Measurement and control of response bias. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), *Measures of personality and social psychological attitudes* (pp. 17–59). San Diego: Academic Press.

Paulhus, D. L. (1998). Interpersonal and intrapsychic adaptiveness of trait self-enhancement: A mixed blessing?. *Journal of Personality and Social Psychology, 74*, 1197–1208.

Paulhus, D. L. (2003). *The UBC word test*. Unpublished instrument, University of British Columbia.

Paulhus, D. L., Harms, P. D., Bruce, M. N., & Lysy, D. C. (2003). The over-claiming technique: Measuring self-enhancement independent of ability. *Journal of Personality and Social Psychology, 84*, 890–904.

Paulhus, D. L., Hemphill, J. F., & Hare, R. D. (in press). *Manual for the Self-report Psychopathy Scale (SRP-III)*. Multi-Health Systems, Toronto/Buffalo.

Paulhus, D. L., Lysy, D. C., & Yik, M. S. M. (1998). Self-report measures of intelligence: Are they useful as proxy IQ tests?. *Journal of Personality, 66*, 525–554.

Paulhus, D. L., Nathanson, C., & Williams, K. M. (2005). A new look at the link between cognitive ability and exam cheating. In B. D. Zumbo (Ed.), *Developments in the theories and applications of measurement, evaluation, and research methodologies across the disciplines*. Vancouver, BC: University of British Columbia Press.

Paulhus, D. L., & Williams, K. M. (2002). The Dark Triad of personality: Narcissism, Machiavellianism, and psychopathy. *Journal of Research in Personality, 36*, 556–563.

Paulhus, D. L., Williams, K. M., & Nathanson, C. (2002, February). *The Dark Triad: Normal evil?* Paper presented at the 3rd annual meeting of the Society for Personality and Social Psychology, Savannah, GA.

Poythress, N. G., Edens, J. F., & Lilienfeld, S. O. (1998). Criterion-related validity of the Psychopathic Personality Inventory in a prison sample. *Psychological Assessment, 10*, 426–430.

Raskin, R., & Hall, C. S. (1979). A Narcissistic Personality Inventory. *Psychological Reports, 45*, 590.

Raskin, R., & Terry, H. (1988). A principal components analysis of the Narcissistic Personality Inventory and further evidence of its construct validity. *Journal of Personality and Social Psychology, 54*, 890–902.

Robinson, E., Amburgey, R., Swank, E., & Faulker, C. (2004). Test cheating in a rural college: Studying the importance of individual and situational factors. *College Student Journal, 38*, 380–395.

Schraw, G. (2001). Review of the Wonderlic Personnel Test and Scholastic Level Exam. In B. S. Plake & J. C. Impara (Eds.), *The fourteenth mental measurements yearbook* (pp. 1363–1364). Lincoln, NE: The Buros Institute of Mental Measurements.

Stern, E. B., & Havlicek, L. (1986). Academic misconduct: Results of faculty and undergraduate student surveys. *Journal of Allied Health, 15*, 129–142.

Turnitin.com. (n.d.). Retrieved February 21, (2005), from http://www.turnitin.com.

van der Linden, W. J., & Sotaridona, L. (in press). Detecting answer copying when the regular response process follows a known response model. *Journal of Educational and Behavioral Statistics.*

Vitale, J. E., Smith, S. S., Brinkley, C. A., & Newman, J. P. (2002). The reliability and validity of the Psychopathy Checklist—Revised in a sample of female offenders. *Criminal Justice and Behavior, 29*, 202–231.

Wesolowsky, G. O. (2000). Detecting excessive similarity in answers on multiple choice exams. *Journal of Applied Statistics, 27*, 909–921.

Whitley, B. E., Jr. (1998). Factors associated with cheating among college students: A review. *Research in Higher Education, 39*, 235–274.

Whitley, B. E., Jr., & Keith-Spiegel, P. (2002). *Academic dishonesty: An educator's guide*. Mahwah, NJ: Erlbaum.

Whitley, B. E., Jr., Nelson, A. B., & Jones, C. J. (1999). Gender differences in cheating attitudes and classroom cheating behavior: A meta-analysis. *Sex Roles, 41*, 657–680.

Williams, K. M., McAndrew, A., Learn, T., Harms, P. D., & Paulhus, D. L. (2001, August). *The Dark Triad returns: Entertainment preferences and misbehavior among narcissists, Machiavellians, and psychopaths.* Poster session at the 109th annual meeting of the American Psychological Association, San Francisco.

Williams, K. M., & Paulhus, D. L. (2004). Factor structure of the Self-Report Psychopathy scale (SRP-II) in non-forensic samples. *Personality and Individual Differences, 37*, 765–778.

Williams, K. M., Paulhus, D. L., & Hare, R. D. (in press). Capturing the four-facet structure of psychopathy by self-report in student samples. *Journal of Personality Assessment.*

Williams, K. M., Trapnell, P. D., & Paulhus, D. L. (2004, June). *Value profiles as measures of personality.* Presented at the 2005 meeting of the Canadian Psychological Association, Montreal.

Wonderlic, E. D. (1983). *Wonderlic Personnel Test manual*. Northfield, IL: E.F. Wonderlic.

Wrightsman, L. S. (1991). Interpersonal trust and attitudes toward human nature. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), *Measures of personality and social psychological attitudes* (Vol. 1, pp. 373–412). San Diego, CA: Academic Press.