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Investigating how autonomy-supportive teaching moderates the relation between student honesty and premeditated cheating

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Background. Cheating at the post-secondary level is a skewed phenomenon. While personality and environmental factors are associated with cheating, few studies account for the zero inflation when predicting cheating behaviour.

Aim. In this study, we explore a person-situation interaction hypothesis where teacher autonomy support (AS) could modify the relation between students' honesty trait and premeditated cheating.

Sample. Participants were 710 college students and 31 teachers.

Methods. Teacher and student reports of teacher AS were collected and students also completed self-reports of honesty and premeditated cheating.

Results. Given that cheating had a zero-inflated negative binomial distribution, we can investigate two separate outcomes: likelihood of cheating and magnitude of cheating. Predictably, student honesty trait predicted lower likelihood and magnitude of cheating. AS, whether student- or teacher-reported, moderated the relation between honesty and likelihood of cheating. In low perceived AS teaching environments, student honesty was associated with cheating likelihood. However, there was no such relation in high perceived AS teaching environments.

Conclusions. Students' honesty generally predicts lower cheating. However, the educational environment provided by the teacher influences the strength of this association. The less autonomy-supportive students perceive the educational environment, the more their personality is important in predicting the likelihood of cheating.

Cheating during an evaluation, defined as an intentional violation of institutional rules regulating academic evaluations (Cizek, 1999), is an important ethical and moral issue that impairs the integrity of academic systems (McCabe, Trevino, & Butterfield, 2001). The overall prevalence of this problem is particularly high at the post-secondary level, with as many as 68% of undergraduate students reporting having cheated at least once on an exam or on an assignment over the course of their studies (International Center for Academic Integrity, 2020). Fortunately, even with a high prevalence of cheating, only a minority of

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students will cheat when considering a specific evaluation (Šorgo, Vavdi, Cigler, & Kralj, 2015). Unsurprisingly, cheating has drawn a lot of attention from school administrations and scholars looking into ways to deter dishonest behaviours, with varying success (Kashian, Cruz, Jang, & Silk, 2015; Reisenwitz, 2012). Indeed, the identification of general correlates of cheating has not helped bring college cheating numbers down in recent years (Case, King, & Case, 2019). In hopes of developing an applied understanding of cheating, educational and psychological research must better document more intricate manifestations of this elusive phenomenon.

Antecedents of cheating

In an effort to understand and prevent cheating, decades of research have focused on personal and environmental factors that could explain this phenomenon (Anderman & Murdock, 2007). Studies with undergraduates first show that a wide variety of personal characteristics are linked to cheating behaviours. For example, younger or male students are more likely to cheat than older or female students (Jensen, Arnett, Feldman, & Cauffman, 2002). Studies looking at college students' personality traits show that impulsive, sensation-seeking students, and those with low self-esteem or low conscientiousness have higher cheating rates than students who do not show these traits (De Bruin & Rudnick, 2007; Korn & Davidovitch, 2016). Moreover, personality traits such as students' honesty, bravery, and empathy were found to be negatively related to self-reported instances of cheating in the past 12 months and to future intention to cheat in the next thirty days (Staats, Hupp, Wallace, & Gresley, 2009). Exploring the association between honesty and cheating (Kleinlogel, Dietz, & Antonakis, 2018; van Rensburg, de Kock, & Derous, 2018) has the potential to deepen our understanding of the dependency of cheating on personality factors. Honesty as a personality trait has been shown to be distinct from the five-factor model (Ashton & Lee, 2007). Specifically, it consists of two facets: sincerity (the tendency to avoid breaking rules) and fairness (i.e., the tendency to avoid manipulating others for personal gain; Ashton & Lee, 2005). Further investigation on the role of the honesty trait in the prediction of cheating behaviours is warranted as personality might predict cheating only in some social environments and less so in others.

Environmental factors such as parental or peer behaviours can indeed predict student cheating. For example, parental use of severe disciplinary techniques with their youth are associated with higher levels of academic cheating in college (Qualls, 2014). Moreover, undergraduates who see or know of other students cheating are more likely to report cheating themselves (Bernardi, Banzhoff, Martino, & Savasta, 2012). Besides these interpersonal social factors, the learning environment itself can have an influence on cheating. For example, most academic institutions who have implemented ways to foster integrity and deter cheating have been somewhat successful in reducing cheating rates on their campuses (McCabe et al., 2001; Popoola et al., 2017). As the primary actors in education, teachers also have a key role to play in modelling and promoting ethical behaviours. Whether or not teachers make students accountable for their unethical behaviours can shape prevailing norms of integrity. In addition, teachers have an important upstream influence through their pedagogy and the learning climate they create. For example, caring college teachers that base their course on clear content and explanations have lower levels of cheating in their classes (Šprajc, Urh, Jerebic, Trivan, & Jereb, 2017). Past research further shows that an effective way for teachers to foster such a positive learning climate is through the use of autonomy-supportive teaching practices

(Reeve, 2009), suggesting that these practices could constitute an additional classroom-level factor influencing students' cheating.

Teacher autonomy-supportive practices

According to self-determination theory (SDT; Ryan & Deci, 2017), teachers differ in the degree to which they support their students' autonomy (i.e., feelings of self-determination). Teachers who provide autonomy support (AS) aim at encouraging students to engage volitionally in their learning by acting with empathy towards their students, giving them more choices, and providing rationales for their demands (Aelterman et al., 2019; Mageau et al., 2015). In a college classroom, for example, these specific behaviours can translate into encouraging students to express themselves and give their opinion, giving them some latitude regarding assignments (e.g., choice of topic) and highlighting how completing assignments will help their learning. AS is about relinquishing to students as much control of their learning experience as possible in the pursuit of learning goals.

Past research has shown that more autonomy-supportive learning environments predict greater internalization of the importance of schoolwork (Soenens & Vansteenkiste, 2005). In turn, students who are engaged in their learning and value learning tasks to a greater extent should be more likely to seek to master the studied subject, an objective that cannot be achieved through cheating (Krou, Hoff, Hewett, & Fong, 2019). We thus advance the idea that an AS classroom environment could influence cheating levels, but also that personality factors, such as the honesty trait, might express themselves differently in an AS classroom environment attuned to students' perspective and learning interests.

Despite the potentially important role that AS could play in preventing cheating, to our knowledge, few research has examined this linkage. Only a few experimental studies have shown that the provision of choice, a component of autonomy support, as well as the satisfaction of the need for autonomy were both negatively related to academic dishonesty (Kanat-Maymon, Benjamin, Stavsky, Shoshani, & Roth, 2015; Patall & Leach, 2015). Studies on college teachers' interpersonal behaviours similar to AS also showed that teachers who respect their students and act fairly towards them are more likely to have students who report fewer instances of cheating (Anderman, 2007; Murdock, Miller, & Goetzinger, 2007). In light of the many educational and interpersonal benefits associated with teacher AS namely, better perseverance (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004), self-esteem (Deci, Hodges, Pierson, & Tomassone, 1992), performance (Soenens & Vansteenkiste, 2005), and many more (see Moreau & Mageau, 2013, for a review), it seems crucial to further examine the potential contribution of teacher AS in the prediction of student cheating. Focusing on teacher AS is particularly important given that these positive interpersonal behaviours have been shown to be teachable (Guay, Valois, Falardeau, & Lessard, 2016; Reeve, 1998) with positive impacts on students (Tessier, Sarrazin, & Ntoumanis, 2010). Such an investigation would also provide a better understanding of the various processes responsible for the emergence of cheating. Yet, with personal characteristics predisposing undergraduates to cheating (Staats et al., 2009), any impact that the interpersonal environment provided by teachers may have on students' cheating is likely to occur in interaction with such personal characteristics. One way in which the interpersonal environment may interact with personal characteristics is by modifying how students' personality guides their behaviour in the classroom.

Honesty trait and AS: a person-situation interaction to predict cheating

According to person-situation frameworks (Buss, 1977; Kihlstrom, 2013), the way people's dispositions affect social behaviours is indeed better understood when the social environment is taken into account. For instance, students' honesty trait could be more predictive of cheating in environments where AS is low. Such autonomy-thwarting environments are indeed likely to activate defence mechanisms in students, which could ultimately emphasize individual differences in the way students cope with adversity. Students' honesty trait could then be a stronger (negative) predictor of cheating levels. In contrast, AS environments, by supporting the need for autonomy (Ryan & Deci, 2017), are likely to foster a climate of trust and engagement for all students, thereby focusing students on learning regardless of their honesty trait orientation. The negative association between honesty trait and cheating would thus be reduced in AS environments. While previous research has shown the honesty-cheating association to be dependent on situational cues (Kleinlogel et al., 2018), no research has examined this possibility ecologically in the classroom context. Building a more refined understanding of how cheating manifests itself is a crucial first step towards the elaboration of targeted and cost-effective interventions to prevent cheating.

The present research

This study aimed at examining the associations between the honesty personality trait, the quality of teachers' interpersonal style in terms of AS, as well as their interaction, on student cheating at the post-secondary level. To our knowledge, this is the first study to examine the interplay between a personality factor, teacher AS, and cheating.

Based on past findings (Staats et al., 2009; van Rensburg et al., 2018), we first hypothesized that students' honesty trait would predict cheating (i.e., main effect).

Hypothesis 1. Students' honesty trait will predict lower levels of cheating.

Based on research showing that teaching quality is associated with lower cheating levels (Murdock et al., 2007) and in light of the numerous benefits of autonomy-supportive social contexts (Moreau & Mageau, 2013), we also hypothesized that teacher AS would predict lower levels of academic cheating in students (i.e., main effect).

Hypothesis 2. Autonomy-supportive teacher behaviours will predict lower levels of cheating.

As a third hypothesis, we expected the teaching environment to moderate the association between students' honesty trait and cheating. Specifically, with AS teachers, the decision to cheat may carry more weight and thus could be much less systematic. However, in non-AS teaching environments where students do not feel in control of their learning, this decision could result more strongly from personal factors.

Hypothesis 3. The relation between students' honesty trait and cheating will be weaker in AS teaching environments compared to non-AS teaching environments, where it will be strong and negative.

Because premeditated cheating is considered more serious and stable than on-the-fly cheating (Ashworth, Bannister, & Thorne, 1997), this study focused on this type of cheating. However, such serious cheating behaviours are bound to present an abnormal distribution. A secondary goal of our study was thus to account for an expected positive skew by implementing a zero-inflated negative binomial approach to the analysis of cheating behaviour (see Plan of analyses). We could not, however, formulate more precise hypotheses in terms of likelihood and magnitude of cheating based on past findings.

Method

Sample

The sample consisted of 710 French-speaking college[1] students (60.9% female, M_{age} = 20.11 years, SD_{age} = 4.11 years) in 31 different classes ($M_{class\ size}$ = 22.9 students, SD = 6.15, MIN_{size} = 11, MAX_{size} = 36). Teachers were 51.6% female (M_{age} = 43.74 years, SD_{age} = 9.17 years). Students and their parents were mostly Canadian-born (71.4%), while 28.6% were either born outside of Canada or had at least one parent that immigrated to Canada. These participants or their parents originated from the Middle East, Europe, Northern Africa, Latin America, Asia, the Caribbean, or Sub-Saharan Africa. Students' parents were generally well-educated with most having completed a college/bachelor (60.2%) or a postgraduate (14.2%) degree. The rest either did not finish high school (1.8%) or had a high school diploma as their highest certification (18.6%; 4.1% missing data on parental education). About 22.6% of the sample had a family revenue below CAD$ 50,000, while 38.0% of families earned between $50,000 and $100,000, and 21.5% earned more than $100,000 (17.9% missing data on family revenue). Of the 31 classes, 18 were in subjects specific to technical training (e.g., physical therapy, firefighting, tourism, nursing, office automation, architecture, electric and civil engineering) while 13 were in more general subjects (e.g., biology, mathematics, arts, psychology, chemistry).

Procedure

Following research ethics committee approval, all teachers (about 500) from a college-level education institution in the province of Quebec in Canada were approached at the beginning of the school year and were invited to participate in this project. Teachers from a wide array of subjects agreed to participate in the study and welcomed the research team in their classroom, who then invited the students to complete paper-and-pencil questionnaires here and now. Participation was voluntary and anonymous, and apart from few exceptions, all students present agreed to participate. The research took place a few weeks after the first evaluation of the autumn semester, in October or November. We tested the studied associations using both students' perceptions of teacher behaviours as well as teachers' self-reported behaviours to verify their robustness across two informants. The full sample was used in analyses, relying on full information maximum likelihood (FIML) to handle missing data (0.96%) as well as robust estimators (MLR).

[1] *In Quebec, college education is separated from university. It starts after the 11th year of schooling (6 years primary, 5 years secondary) and offers either 2 years of general pre-university training (e.g., social, scientific, arts, administration) or 3 years of technical training.*

Measures

Teacher-reported autonomy-supportive behaviours

Teachers completed the Situations-in-School questionnaire (SIS; Aelterman et al., 2019) which assesses their AS tendencies using twelve situations (e.g., 'The class period begins. You are interested to know what the students know about the learning topic'.). The scale was translated in French using back-to-back translation (van de Vijver & Hambleton, 1996). The scale was answered on a 7-point rating scale (1 = *Does not describe me at all*; 7 = *Describes me extremely well*). The SIS was originally tested on multiple samples and presents vignettes varying in timing (before, during, and after the lesson), situation type (problematic vs. casual) and substance (e.g., relative to learning content or code of conduct). The validation article also showed strong convergent reliability with other autonomy support scales (Aelterman et al., 2019). Reliability indices for all scales are presented in Table 1.

Student-reported autonomy-supportive behaviours

Students completed the Perceived Autonomy Support Scale for Teachers (PASS-T), which assesses students' perceptions of teachers' use of AS. The PASS-T is an adapted version of the Perceived Parental Autonomy Support Scale (P-PASS; Mageau et al., 2015), which has shown high validity in capturing parental AS. To capture teacher AS, the parent/household focus was changed to a teacher/classroom one but the same three AS subfactors were assessed: *providing a rationale* (a sample item: My teacher makes sure that I understand why he/she asks me to learn certain things), *offering choices and opportunities for decision-making* (a sample item: 'My teacher gives me many opportunities to make choices regarding assignments), and *acknowledging feelings* (a sample item: 'My teacher is open to my thoughts [and my emotions] even when they are different from his or hers'). Each subfactor contained four items and students rated each of these while thinking about the teacher assigned to the course in which the survey took place. All student-reported scales were answered on a 7-point Likert-type rating scale (*Does not agree at all* to *Very strongly agree*).

Honesty trait

The honest personality trait was measured using the Honesty sub-dimensions of the French version of the 200-item HEXACO personality inventory (HEXACO-PI-R; Lee & Ashton, 2004). Participants answered two 8-item subscales: fairness (a sample item: 'If I knew that I could never get caught, I would be willing to steal a million dollars. [Reversed]') and sincerity (a sample item: 'I wouldn't use flattery to get a raise or promotion at work, even if I thought it would succeed.'). The predictive validity of the H dimension of the HEXACO has been supported in various studies (Ashton & Lee, 2005, 2008; van Rensburg et al., 2018), linking it to academic cheating and even common crime. The French version has also been validated in previous studies (Boies, Yoo, Ebacher, Lee, & Ashton, 2004; Saroglou, Pichon, Trompette, Verschueren, & Dernelle, 2005), showing appropriate score distributions and high scale score reliability, as in the original version.

Table 1. Reliability and correlations across all predictors and covariates

Variable	*M*	*SD*	Reliability	(1)	(2)	(3)	(4)
1 Premeditated cheating	0.52	1.69	–	–			
2 Student honesty	5.48	0.92	ω = .69	−.27**	–		
3 Perceived (by students) teacher autonomy support	5.14	1.11	ω = .92	−.10*	.12**	–	
4 Teacher self-reported autonomy support	4.95	0.77	α = .69	.00	.09*	.26**	–
5 Age	20.1	4.17	–	.02	.05	.00	−.03
6 Gender	–	–	–	.12**	−.25**	−.04	−.11**
7 Parental income	–	–	–	−.05	.06	−.01	−.09*
8 Parental level of education	–	–	–	.04	−.05	−.02	−.02

Note. Gender is coded as 1: Female and 2: Male. ω: McDonald's omega; α: Cronbach's alpha.
*$p < .05$, **$p < .01$.

Self-reported premeditated cheating

Participants reported their cheating by completing a scale that assessed premeditation of cheating. Because no encompassing validated tool for measuring general self-reported cheating on examinations was found when planning this study (see Ferrell & Daniel, 1995; McKibban & Burdsal, 2013 for relevant cheating measurement tools), we designed a scale that comprised various behaviours expressing the premeditation of cheating on examinations in increasing order of severity (see the Supporting Information for full description of the development process of the scale, including full items and other statistics). Specifically, the scale identified behaviours that occurred prior to examinations (three items; a sample item: 'I developed a strategy with other students to cheat during the evaluation') or during examinations (one item: 'I had access to unauthorized material (e.g., hidden notes, phone)'). While these behaviours are not expected to always co-occur, they are still considered an expression of students' overall tendency to premeditate cheating. A CFA with categorical indicators confirms that these four cheating items do typically co-occur and form a single factor (loadings ranging from .76 to .87, CFI = .99, TLI = .97, RMSEA = .09, SRMR = .03). Scoring '0 – *Does not agree at all*"' on an item of this scale was computed as '0' magnitude of cheating, whereas scoring '1 – *Very slightly agree*' through '6 – *Very strongly agree*' was respectively scored as 1 through 6 magnitude. The maximum theoretical magnitude of cheating was 24. Three of the four items had answers ranging across the 7 possible response points, while answers on the other had a 5-point range despite a 7-point theoretical range. In this study, cheating magnitude ranged from 0 to 14. While anonymity of participation was guaranteed and emphasized, some socially desirable responding can be assumed because of the sensitive nature of this data. However, simulation studies have shown that this bias has minimal effects on the accuracy of correlational estimates (Paunonen & LeBel, 2012). Still, the cheating variable contained a substantial amount of 'all 0' responses (85.7%; see Figure 1).

Plan of analyses

A heavy floor effect (zero inflation) and overdispersion of the dependent variable (mean value much lower than the variance; $M = 0.523$, $s^2 = 2.858$) violated the assumptions of parametric analyses. We used a zero-inflated negative binomial (ZINB) regression model

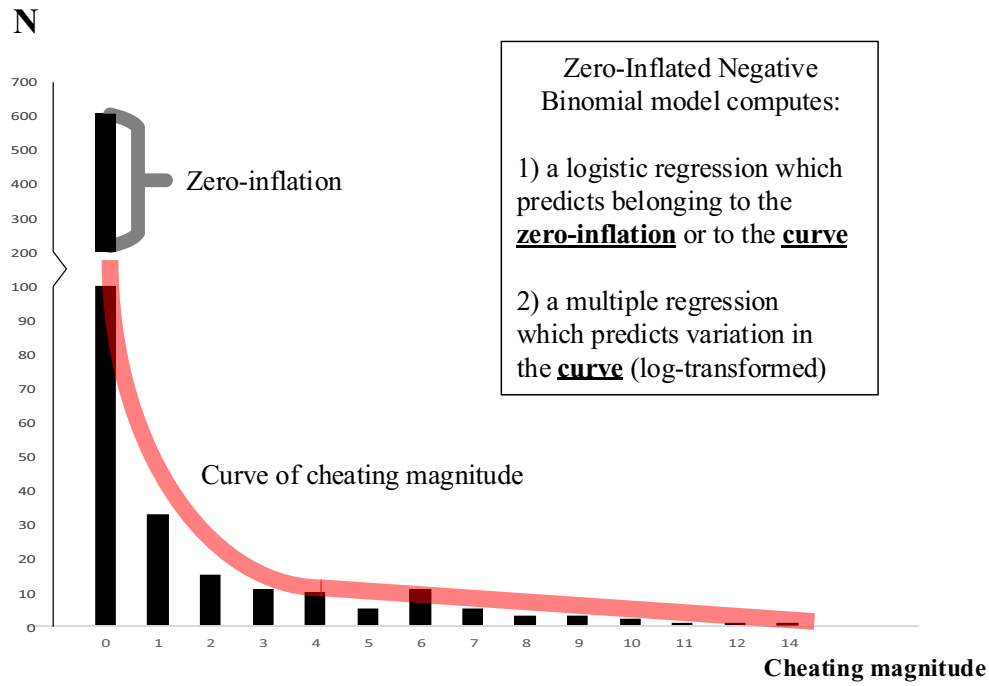

Figure 1. Distribution for the cheating variable (count) with explanation for ZINB computations.

(Long, 1997; see Minami, Lennert-Cody, Gao, & Román-Verdesoto, 2007, for an example) to better represent and predict the self-reported measure of cheating. The goal of this analysis is to distinguish students who premeditated cheating or could have premeditated cheating but did not from those who did not premeditate cheating because they, purportedly, would never do it (and should thus be excluded from the analysis of the phenomenon and treated as a zero inflation). Specifically, ZINB regression models treat the dependent variable as a count variable and estimate two contiguous regression equations.

The first equation is a logistic regression predicting categorical membership between two latent classes: one class being the zero inflation, the other being the negative binomial distribution (see Figure 1), which includes all data with cheating scores above 0 as well as a weighted portion of 0 values. Based on the distribution of cheating scores, the *likelihood of cheating* is estimated and used to distinguish between participants who never cheat (zero inflation) and those who may or did premeditate cheating. Participants with a cheating score of 0 are weighted according to their general probability of belonging to either class. The second equation of the ZINB model estimates the *magnitude of cheating premeditation* by assessing variation in the negative binomial curve. Thus, the second regression is a multiple regression (with logarithmic transformation to respect the assumption of DV normality) predicting variability in the distribution. We thus present the results in terms of cheating likelihood (logistic regression) and cheating magnitude (multiple regression).

Two different moderation models were tested, one for student reports of AS teacher behaviours (Figure 2, Model 1) and one for teacher self-reports of AS (Figure 2, Model 2).

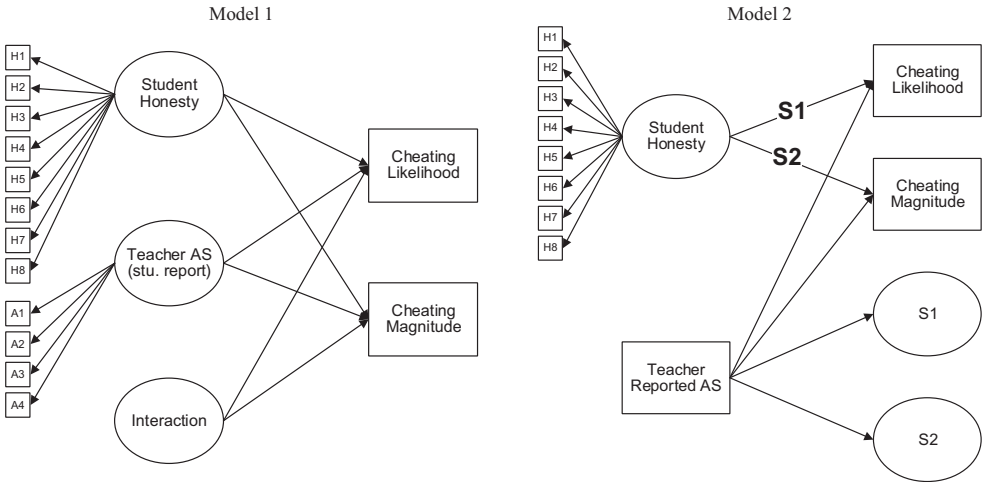

Figure 2. Hypothesized moderation models for student reported (Model 1) and teacher reported (Model 2) autonomy support. *Note*. Latent variables and random slopes are presented in ellipses whereas parcels, observed totals and count outcomes are presented in rectangles. AS = Autonomy support; S1 = Random slope 1, between honesty and cheating likelihood; S2 = Random slope 2, between honesty and cheating magnitude.

In analyses testing the moderation with student reports of teacher behaviours, interactions between student honesty and student-perceived teacher AS were computed using the XWITH function in Mplus 8.1 (Muthén & Muthén, 2017). Mplus handles latent interactions with the XWITH command by creating a latent variable whose indicators are the diagonal of the matrix computed from the indicators of the two interacting variables. Because the latent interaction is complex and dependent on the stability of the indicators, parcels were computed for AS and honesty (4 parcels for AS, 8 parcels for honesty, each parcel being a combination of 1 item per subscale).

In analyses using teacher reports of AS to test the moderation model, random slopes were first enabled in the association between honesty trait and cheating. Random slopes allow estimates of the association between honesty and cheating to vary across individuals. Moderating variables can then be introduced by allowing them to predict individual differences in slopes. In this analysis, a scale composite of teacher-reported AS was used as moderating variable.

Complex survey data

Because we surveyed students nested within classes, each taught by a single teacher, the current data were hierarchical in nature. While students in a same classroom seemed to have a common general perception of whether their teachers were autonomy-supportive (ICC_{AS} = .36), occurrence of cheating showed low systematic between-class variance ($ICC_{Cheating}$ = .01). Because more than 99% of the variance in cheating occurred at the individual levels, multilevel analyses were considered an unnecessary forfeit of parsimony. Thus, all analyses were carried using a sandwich estimator (TYPE = COMPLEX) in Mplus 8.1 (Muthén & Muthén, 2017) to obtain unbiased standard errors correcting for the non-independent nature of the data within classes (Williams, 2000).

This allowed us to perform analyses at the student level despite having nested observations within classrooms. In contrast with multilevel models where between-class variance is analysed solely at Level-2, with TYPE = COMPLEX, the classroom-level variance (or lack thereof) is used to readjust the standard errors at the student level of analysis. All our analyses are thus performed at a single level.

Results

Preliminary analyses

Table 1 presents means, standard deviations, reliability coefficients, and bivariate correlations for all independent factors, as well as for covariates of students' gender, age, and their parents' income and highest study level. Although students' honesty trait and teachers' self-reported autonomy support were measured with validated scales, their reliability coefficients were only moderate (i.e., true variance in these constructs only neared 70%). Perceived autonomy support had higher reliability estimates. Inspection of bivariate correlations revealed significant associations between students' honesty trait and teacher AS, both for perceived and self-reported teacher behaviours. Student- and teacher reports of AS were correlated between informants, but not strongly so ($r = .26$). Of all covariates, only gender was associated with cheating. Gender was thus included in preliminary models as a predictor of cheating, along with student honesty and either student- or teacher-report of AS (one model with student-report of AS, one model with teacher-report of AS; see Table S3 for model results). In both models, gender was not a significant predictor of cheating once other correlates were considered. For parsimony, gender was thus excluded from further analyses.

Main analyses

Using a ZINB latent regression interaction model, Model 1 (Figure 2) tested the prediction of cheating likelihood (i.e., latent class logistic regression predicting no likelihood of cheating vs. some likelihood) as well as cheating magnitude (i.e., variability in the cheating distribution, including only a weighted portion of *null* cheating scores calculated to reflect the skewed distribution while correcting for its zero inflation) by student honesty trait and student perception of teacher AS (main effects). We also tested the moderating effects of student-perceived teacher AS on the association between student honesty and cheating, that is, on the prediction of cheating likelihood and magnitude. For the main effects (see Table 2 for all coefficients), student honesty negatively predicted cheating likelihood (OR = 0.46; $p < .001$), indicating that increase in honesty was associated with reduced odds to cheat. Honesty also predicted lower levels of cheating magnitude ($B = -0.24$; $p = .008$). In contrast, student-perceived teacher AS showed no main effect in predicting cheating likelihood or magnitude. Thus, with student reports of teacher behaviours, *H1* was supported but *H2* was not.

When examining interactions (see Table 3 for slope coefficients), AS significantly moderated the honesty/cheating likelihood association ($p = .009$), but not the honesty/cheating magnitude association ($p = .49$). The significant interaction is detailed in Figure 3. When decomposing the moderating effect of AS, we observed a moderately negative honesty/cheating likelihood association in high perceived AS environments. In contrast, the honesty/cheating likelihood association was much stronger in low perceived AS environments. Thus, in high perceived AS environments, students' honesty was not as

Table 2. Interpretation and obtained coefficients for Model 1 (Student-Report) and Model 2 (Teacher-Report of Teacher Behaviours)

DV	Cheating likelihood (N = 710)		Cheating magnitude (N = 710[a])	
Regression type	Logistic		Regular with log transformation	
Interpretation	Chance to belong in the 'cheated/could have cheated' vs. the 'never cheats' class		Strength of agreement with cheating items	
	Odds ratio[b]	[95% CI] (p)	B[c] (IRR[d])	[95% CI] (p)
Model 1 (with student-reported measures)				
STEP 1: main effects only				
Student honesty	**0.46**	**[0.34–0.62] (<.001)**	**−0.24 (0.79)**	**[−0.41 to −0.06] (.008)**
Teacher AS	0.90	[0.72–1.12] (.35)	−0.09 (0.92)	[−0.28 to 0.11] (.39)
STEP 2: main effects and interaction				
Interaction (honesty with AS)	**1.44**	**[1.09–1.89] (.009)**	−0.09 (0.91)	[−0.34 to 0.16] (.49)
Model 2 (with teacher-reported AS [N = 31])				
STEP 1: main effects only				
Student honesty (*random slopes*)	**0.45**	**[0.34–0.59] (<.001)**	**−0.26 (0.77)**	**[−0.43 to −0.09] (.003)**
Teacher AS	1.12	[0.87–1.46] (.38)	0.04 (1.04)	[−0.23 to 0.31] (.78)
STEP 2: main effects and interaction				
Slope prediction by AS	**1.38**	**[1.01–1.90] (.04)**	−0.06 (0.94)	[−0.22 to 0.10] (.49)

Note. Significant parameters highlighted in bold.
AS = autonomy support; CI = confidence interval; IRR = incidence rate ratio.
[a]Participants with a score of 0 cheating are assigned a lesser weight in this analysis as a function of their latent probability of belonging in the 'could have cheated' class. Other participants are analysed regularly.; [b]Values below 1 indicate a higher chance to belong in the 'never cheats' class.; [c]Indicates an expected log count increase (or decrease if negative) in cheating magnitude as a function of one unit increase in IV.; [d]Indicates the rate of increase (or decrease if below 1) in cheating magnitude as a function of one unit increase in IV.

Table 3. Odds ratios and significance values of slopes between honesty and cheating likelihood in interactions with AS

	Model 1, Student report		Model 2, Teacher report of AS	
Slope	OR[a]	p	OR[a]	p
+ 1 *SD* of AS	0.66	.003	0.62	.003
−1 *SD* of AS	0.32	<.001	0.32	<.001

Note. AS = autonomy support; OR = odds ratio.
[a]Values below 1 would indicate that, at this level of AS, an increase of one *SD* in honest personality leads to a lesser odd to belong to the 'cheated/could have cheated' class and a higher odd to belong to the 'never cheats' class.

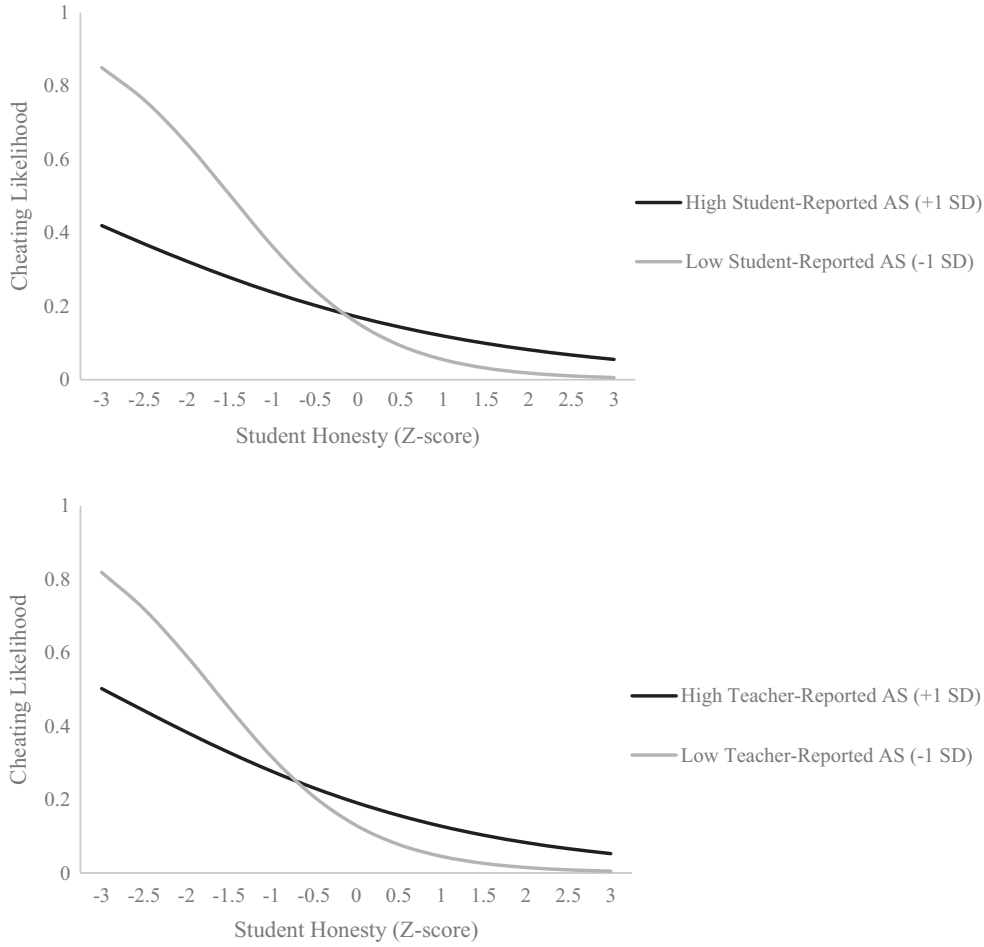

Figure 3. Interaction Between Student Honesty and Perceived Teacher Autonomy Support in Predicting Cheating Likelihood Through Logistic Regression (Top: Student-Report of AS; Bottom: Teacher-Report of AS). *Note*. In the shown logistic regression results all slopes are significant. 0 indicates a perfect probability of being in the zero-inflation class where cheating premeditation never occurs, whereas 1 indicates a perfect probability of being in the distribution, where cheating premeditation may occur. AS = Autonomy Support.

strongly related to cheating likelihood as in low perceived AS environments. Overall, Model 1 supported *H3*. Yet, contrary to expectations, there was still a moderate negative association between honesty and cheating likelihood in classrooms with more AS teachers.

Model 2

Using a ZINB random slopes model, Model 2 (Figure 2) tested the prediction of cheating likelihood and magnitude by the honesty trait and teacher-reported AS (main effects), along with the moderating effect of teacher-reported AS on the associations between student honesty and the two cheating indicators established by the ZINB model. Main

effects yielded almost identical results as in Model 1 (see Table 2 for all coefficients). Thus, using teacher reports of AS, *H1* was also supported but *H2* was not. When examining interactions (prediction of the random slopes by AS), although the statistical procedure testing the interaction was different and the amount of data points collected for teacher-level measure of AS was much lower (i.e., 31 teachers vs. 710 students), similar interaction effects were obtained (see Table 3 for slope coefficients). AS significantly moderated the effect of honesty on cheating likelihood ($p = .04$). The significant interaction is detailed in Figure 3. When decomposing the moderating effects of AS, we observed near identical results as in Model 1. Consequently, Model 2 also supported *H3*.

Discussion

Overall, the present results show that students' honesty trait negatively predicts the likelihood and magnitude of cheating premeditation. Teacher autonomy-supportive behaviours did not directly predict students' cheating premeditation, which was unexpected given the central importance of classroom contexts in predicting cheating (Anderman, 2007). Yet, teacher AS was found to moderate the relation between students' honesty trait and academic cheating. Specifically, as hypothesized, results showed that when teachers' AS was high, students' honesty was not a strong predictor of their likelihood of cheating. Conversely, when teachers' AS was low, students' honesty was a strong negative predictor of their likelihood of cheating. Differentiating between the likelihood of cheating and the magnitude at which a student can cheat using ZINB regression models thus revealed a nuanced interpretation of the contributing role of teachers' AS behaviours on the relation between honesty and academic cheating. We offer a detailed interpretation of the results, as well as important implications and avenues for future research.

Main effects of honesty and AS

As previous research has shown (Staats et al., 2009), honesty trait was a significant predictor of cheating. However, the ZINB modelling approach used in this study to estimate cheating allowed us to distinguish between two complementary indicators of cheating premeditation: participants' likelihood to premeditate cheating and the magnitude of their cheating premeditation. The present results showed that honesty levels were strongly associated with both likelihood and magnitude of cheating. Future research could perform a more precise test of these associations by using behavioural measures of cheating to determine if personality can objectively predict cheating occurrences.

To our knowledge, the present results are the first to test the prediction of cheating by teachers' AS explicitly, and using both teacher reports and student perceptions of teacher AS. Interestingly, students had a fairly common perception of their teacher's AS behaviours, with around 36% of variance occurring at the classroom level. Contrary to our hypotheses, no direct association was found between teachers' interpersonal behaviours and students' cheating. These results may imply that, in post-secondary education, teachers are not social agents with enough influence to alter students' decisions regarding cheating. It would be interesting to see if this is the case at every educational level. It is possible that a more pronounced direct association could be found during primary and secondary education, where students and teachers share a more proximal interpersonal

relationship. Although teachers' autonomy-supportive behaviours were not directly predictive of students' cheating, our findings show that they moderated the association between students' honesty trait and cheating.

A person-situation approach for predicting student cheating

As expected, teacher behaviours moderated the link between students' characteristics and cheating. Specifically, autonomy support interacted with students' honesty to predict cheating likelihood. Autonomy-supportive teachers support the need for autonomy and are thus more likely to foster a climate of trust and engagement for all students. With AS teachers, students of various honesty levels should thus focus similarly on the goal of learning, thereby reducing the strength of the association between honesty and cheating likelihood in AS learning contexts. In contrast, non-AS learning contexts can thwart students' need for autonomy. Students could thus be more likely to cope with such adverse context by resorting to cheating, but only if this fits their personality. Our results suggest that this may indeed be the case when predicting cheating likelihood. In line with *H3*, students' honesty level and cheating likelihood were more strongly associated in low perceived AS environments than they were in high perceived AS environments.

Implications

This research and others (Bing et al., 2012; Lee, Bong, & Kim, 2014) revealed a significant interaction between personality and environmental factors in predicting cheating. Investigating person by situation interactions should thus yield more nuanced predictions that are susceptible to be more aligned with students' experiences. A more comprehensive understanding of cheating tendencies would in turn have high applied value for the development of prevention interventions. For example, documenting how various teacher characteristics may impact the expression of personality factors could help design interventions that would more effectively help specific groups of students, compared to more general interventions with unspecified targets.

The present research also demonstrated how the assessment of cheating is likely to present a zero-inflated distribution. Cheating self-reports are unlikely to be normally distributed, and it is thus important to analyse this type of variable with the appropriate regression models. Otherwise, the results could be biased and their interpretations, inaccurate. The ZINB model used in this study enabled us to account for the zero-inflation part of the variable while capturing the variation on the cheating scale. Overall, ZINB analyses of cheating scales are likely to yield an understanding of the cheating phenomenon that is more nuanced while also avoiding inappropriate use of parametric analyses or loss of information in dichotomization.

Limitations and directions for future research

While this study is the first to detail how perceived AS teaching behaviours alter the association between honesty and cheating, the study is not without limitation. First, all measures were collected at a single time point such that we cannot infer any direction of causality between variables. In addition, assessing all variables simultaneously using a cross-sectional design implied a recollection of past cheating behaviour (pertaining to the last evaluation in the course), while the honest personality disposition was measured in the present (without a time reference). The study's hypotheses were thus based on the

assumption that the assessment of personality, which is relatively stable over time (Milojev & Sibley, 2017), could be reliably used to infer participants' personality at the time of the last evaluation in the course. A prospective study establishing a baseline for personality measures, and then measuring subsequent cheating behaviour, is needed to replicate the proposed sequence. Second, although students were informed that their responses would be anonymous, completion of the questionnaire in class may have led to lower disclosure of cheating behaviours. Third, this was a somewhat high SES sample, which may be characteristic of post-secondary education students but can still affect the generalizability of the results. Fourth, the cheating-dependent variable was measured with a scale that was created for this study and only limited validity information is available. Further validation of the cheating scale is thus called for. Finally, because of the nature of the measured construct, an important floor effect was expected. While categorical CFA helped assess its psychometric properties, future research will allow improving the sensitivity and validity of similar cheating scales. Furthermore, although self-report measures of academic cheating remain relevant, more objective assessments of cheating, including laboratory experiments, are promising to better understand the role of honesty and autonomy support in manifestations of cheating with reduced bias. Importantly, cheating in laboratory settings has been recently associated with cheating in real-life settings (Potters & Stoop, 2016) and with school misconduct (Cohn & Maréchal, 2018). Future studies could use an experimental design to corroborate the interaction between autonomy support and honesty in predicting cheating, as it has been done with other experiments on person-situation interactions in previous work on cheating (Akeley Spear & Miller, 2012; Bing et al., 2012).

Conclusion

Cheating in college, particularly in high-stake examinations, leads to flawed, invalid assessments and unsecured use of tests. It is important to find ways to promote academic integrity and deter cheating. The present study documents direct associations between honesty as a personality variable and the likelihood and magnitude of premeditated cheating. Furthermore, moderation analyses show that students' honesty trait will differently affect likelihood of cheating whether students are taught by an autonomy-supportive or a non-autonomy-supportive teacher. A deeper understanding of the mechanics through which teacher behaviours affect individual processes related to cheating will help plan optimal teaching practices and future prevention programs to maximize integrity.

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Conflicts of interest

All authors declare no conflict of interest.

Author contributions

Frederic Guay (Methodology; Resources; Supervision; Writing – review & editing) Geneviève A. Mageau (Conceptualization; Funding acquisition; Methodology; Project administration; Resources; Supervision; Writing – review & editing) Julien S. Bureau, Ph.D. (Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Writing – original draft; Writing – review & editing) Alexandre Gareau (Conceptualization; Formal analysis; Methodology; Software; Validation; Writing – review & editing).

Data availability statement

The data that support the findings of this study are available from the corresponding author, Julien S. Bureau, upon reasonable request. Associated Supporting Information are made available through Open Science Framework. Files can be found with the following link: https://osf.io/93rxf/?view_only=60e9af0849b840ffbab6793cee5f2cc9

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Supporting Information

The following supporting information may be found in the online edition of the article:

Appendix S1. Online supplemental materials including details on the cheating scale and breakdown of "main effects" models with gender.