Evaluation of a Tutorial Designed to Promote Academic Integrity

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Abstract

Academic integrity violations undermine principles of integrity and the quality of education. Reducing the prevalence of dishonesty in scholarly work requires a multi-faceted approach (Stephens, 2016), which may include the implementation of e-learning tutorials. Tutorials and other brief educational interventions increase students' perceived knowledge and understanding of academic integrity and related topics (Stoesz & Yudintseva, 2018); however, it is unclear from the literature which students benefit most from completing them. In two studies, secondary (i.e., middle and high) school students were recruited to complete an e-learning tutorial and surveys about academic integrity, approaches to learning, motivation for learning, and personality. 95 students participated in an online study, but only 15 participants completed the tutorial. Knowledge and perceived seriousness of academic integrity violations increased significantly in this small sample; these changes were not evident in the remaining participants. A follow-up study with 90 students (88 of which completed the tutorial) tested in face-to-face classroom sessions confirmed the results of the first study. Moreover, the changes in perception were larger for the youngest and oldest participants compared to the middle age group, and were correlated with use of deep learning strategies and agreeableness. Overall, the findings provide evidence for the effectiveness of academic integrity tutorials, and suggest individual difference factors must be considered when designing and implementing brief educational interventions. Examining behaviour change and long-term outcomes for secondary school students, and exploring the influences of learning environment and teacher characteristics on learning the values of academic integrity are important avenues for future research.

Keywords: academic integrity, Canada, cheating, education, e-learning tutorial, intervention, secondary school, teaching strategy

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Evaluation of a Tutorial Designed to Promote Academic Integrity

Plagiarism, unauthorized collaboration on tests and assignments, and other academic integrity violations are of great concern to educators as these violations undermine principles of integrity and the quality of education (see Zivcakova & Wood, 2014). Depending on the sample of participants surveyed and the academic integrity violation studied, researchers have estimated that 49.7 - 93% of high school (Galloway, 2012; Williams et al., 2010) and 28 - 81% post-secondary students (e.g., Birks, Smithson, Antney, Zhao, & Burkot, 2018; Ma, Mccabe, & Liu, 2013) have engaged in one or more activities at least once to gain an unfair advantage over others in academic work. A recent meta-analysis revealed that the prevalence of academic dishonesty has increased significantly over the past 38 years (Newton, 2018; but see Curtis & Clare, 2017). Students may engage in questionable academic activities because they want to save time (Sisti, 2007), do not recognize these activities as dishonest (Hughes & McCabe, 2006) or serious (Newton, 2016), feel that cheating is the norm (Strom & Strom, 2007), and/or believe that the benefits of cheating outweigh potential consequences (Galloway & Conner, 2015). Moreover, situational factors (Jurdi, Hage, & Chow, 2011), personality traits (Nathanson, Paulhus, & Williams, 2006; Williams, Nathanson, & Paulhus, 2010), and approaches to and motivations for learning and unrestrained achievement (Williams et al., 2010) are important determinants of cheating behaviour. Younger age (Kisamore, Stone, & Jawahar, 2007; Nonis & Swift, 2001) and male gender (McCabe & Trevino, 1995; Whitley, Nelson, & Jones, 1999) have been also cited as risk factors for engaging in dishonest activities in scholarly work.

Creating a culture of academic integrity may be key to preventing dishonesty in scholarly work, which may be accomplished by using a tiered and multi-faceted approach that includes the implementation of school-wide education, context-specific prevention strategies, and individual remediation (Stephens, 2016). As evident from the websites of many post-secondary institutions in Canada and around the world, educational resources about academic integrity and related topics have been developed in various forms, including student support available in libraries and writing centres and teaching support for educators. E-learning tutorials are another common method for promoting academic integrity or attempting to prevent academic misconduct at the post-secondary level (see Stoesz & Yudintseva, 2018 for a review) because many are easily implemented in existing courses and can be completed as homework, potentially saving class time for other teaching and learning activities. The existing evidence (while limited) suggests that brief educational interventions increase students' perceived understanding of academic integrity policies (Morgan & Hart, 2013) and plagiarism (Barry, 2006), and reduce students' use of overlapping words and word strings in assignments (Landau, Druen, & Arcuri, 2002).

Although evidence for the effectiveness of academic integrity tutorials exists, it is unclear

which students benefit most from completing them. In the relevant literature, student characteristics (such as age) are typically presented as descriptive statistics and are not included as factors in the primary analyses (Stoesz & Yudintseva, 2018); however, there are two exceptions. Smedley, Crawford, and Cloete (2015) reported that younger (< 24 years of age) compared to older (> 24 years of age) undergraduate nursing students benefited more from an intervention designed to increase knowledge and understanding of plagiarism, but Dee and Jacob (2012) found that college year was not a significant predictor of intervention success. The two factors of age and grade level, however, are often confounded. Interestingly, the effectiveness of academic integrity tutorials has not typically been tested with secondary (i.e., middle and high) school students (Stoesz & Yudintseva, 2018). This is an important limitation in the literature as shifting attitudes and behaviours early in students' academic careers are vital as ingrained patterns of academic dishonesty can lead to questionable behaviours in future studies, work, and other areas of life (e.g., Cronan, Mullins, & Douglas, 2018; Nonis & Swift, 2001; Whitley et al., 1999). To our knowledge, the influence of other individual difference factors associated with cheating behaviour (e.g., personality traits) on academic integrity tutorial effectiveness have not been examined. Given these findings, the primary goals of the present research were to examine the effectiveness of e-learning tutorials about academic integrity with students of various ages enrolled in high school courses and determine which students benefit most from completing brief educational interventions of this type.

Study 1

Research suggests that younger students are more likely to engage in academic dishonesty than older students (Kisamore et al., 2007; Nonis & Swift, 2001), but most of the research on the prevalence of cheating and age differences has focused on the post-secondary level. A smaller literature describes cheating rates in secondary schools. Research has shown that as many as 93% of students in grades 9 to 12 have cheated at least once for any type of violation, but the rates drop when examining specific violations (Galloway, 2012). For example, when surveying students about getting answers from other students who have already taken the test, 49.7 % (grade 9) to 85.3% (grade 12) of students report this type of behaviour (Galloway, 2012). In other work, researchers estimated that 52% and 74% of adolescents admitted to cheating on tests and copying peers' homework, respectively (Josephson Institute Center for Youth Ethics, 2012). Given these statistics, it makes sense to teach secondary school students about academic integrity to correct any misconceptions they may have about (un)acceptable schoolwork and to circumvent inappropriate scholarly activities. Beginning academic integrity education early is likely to have the greatest impact. Younger students may be more flexible in their views of academic integrity because concepts of ethics, belief systems, and personal philosophy are integrated during this developmental period and are subject to shifts as new information becomes available (Damon & Hart, 1992). For older students, increases in knowledge and shifting attitudes about academic integrity may not be as dramatic following an educational intervention because beliefs about cheating as unethical may already be crystalized (Sheard, Markham, & Dick, 2003).

Age effects in knowledge increases or attitude shifts following tutorial completion may vary depending on other individual difference factors associated with academic cheating or attitudes about academic dishonesty (Jurdi et al., 2011; Minarcik & Bridges, 2015). Study orientations or approaches to learning, for example, have been shown to be predictive of academic cheating. Previous research findings suggest that university students who use evidence and logic during study and those who rely less on others to define learning tasks for them are less likely to engage in dishonest scholarly activities (Norton, Tilley, Newstead, & Franklyn-Stokes, 2001). In addition, students with low levels of self-efficacy (Finn & Frone, 2004) and less motivation to learn (Anderman, Griesinger, & Westerfield, 1998; Sheard et al., 2003) engage in more academic cheating. In a sample of 315 high school and college students, Finn and Frone found that even low performing students cheated less when they felt a high level of competency to complete tasks or accomplish goals. Lower levels of the personality traits of agreeableness and conscientiousness (Peled, Eshet, Barczyk, & Grinautski, 2019; Williams et al., 2010) have also been linked to higher self-reported academic dishonesty. These findings make sense given that lower levels of these personality traits are often defined by uncooperativeness, irresponsibility, disorganization, and impulsivity (see Hogan & Hogan, 1989; Lee & Ashton, 2014), which may give rise to poor study skills and lack of preparation for assessment leading to decisions to cheat. Given that relationships between age and gender, approaches to and motivation for learning, and personality factors with regards to cheating behaviour and attitudes, we hypothesized that these factors may also influence the degree of knowledge and attitude change following the completion of an educational intervention. We hypothesized that younger students would benefit more from an academic integrity tutorial than older students taking similar levels of courses (i.e., high school courses) because they have had less exposure to information about appropriate/inappropriate scholarly behaviours or are at earlier stages in their moral development (Bélanger, Leonard, & LeBrasseur, 2012; Damon & Hart, 1992; Sheard et al., 2003). To this end, we tested a brief e-learning tutorial designed to inform students about academic integrity, academic integrity violations and possible consequences, and support and resources to prevent academic dishonesty. We designed a study that would be naturalistic in terms of the environment that students enrolled in high school level courses may be asked to complete such a tutorial during the course of their studies (e.g., on their computers as homework). An online study with self-report measures for collecting information on pre- and post-tutorial measures of academic integrity and individual difference factors was deemed appropriate for this investigation, and allowed us to measure the extent of tutorial uptake.

Method

Participants. One hundred students (aged 17 – 32 years) enrolled in high school level courses in high schools and alternative education centres in Manitoba, Canada were recruited to participate via an advertisement shared on a social media platform. Interested students emailed the researcher and received detailed study information, a username, and a password to login to the online study delivered via a learning management system (LMS; Brightspace, D2L, Kitchener, ON). For participants aged 17 years, a parent/legal guardian provided consent via email prior to the distribution of the login information to the

participant. Ninety-five students consented to participate and received a $20 e-gift card via email upon consent. See Table 1 for demographic characteristics of the sample. The Joint Faculty Research Ethics Board (JFREB) at the University of Manitoba approved this study.

Table 1
Participant Demographics

Variable		Study 1 (*n* = 95) %	Study 2 (*n* = 90) %
Gender	Female	57.9	20.0
	Male	36.8	66.7
Age	*n*	89	81
Age (years)	*Mean* (*SD*)	24.1 (4.7)	15.3 (1.5)
	Range	17 - 32	12.8 - 17.9
Grade level	8		27.8
	10	11.6	15.6
	11	18.9	46.7
	12	45.3	
	alternative education centre	17.9	
Average grade	50-59%	1.1	-
	60-69%	6.3	1.1
	70-79%	29.4	3.3
	80-89%	32.6	34.4
	90-100%	25.3	47.8
First language	English	88.4	61.1
	Other	6.3	28.9
Location of primary and secondary school education	Canada	93.7	83.3
	Outside of Canada	1.1	6.7
Planning to pursue post-secondary education		93.7	84.4

Materials and Procedure. Participants were asked to complete one of two versions of the academic integrity tutorial[1] and respond to survey items about academic integrity, approaches to learning, motivation, demographic information, and personality. Tutorial assignment was pre-determined and linked to specific login information. As participants communicated their interest in participating in Study 1, they were randomly assigned a username and password. Half of the participants gained access to the game-based tutorial, and the other half gained access to the other text-based version of the tutorial.

Academic Integrity Tutorials. Two academic integrity tutorials (developed by the first author) that provided general overview of expectations about academic integrity at a post-secondary educational institution were used in this study. The tutorial objectives were to increase understanding of the meaning of academic integrity and its importance; categories of academic integrity violations and consequences; and supports and resources to promote academic integrity and avoid dishonesty. Both tutorials consisted of three content areas and each was followed by a 5-question quiz. If participants answered one or more questions incorrectly, they were directed to repeat study of the relevant content area. One tutorial was designed with game design elements (e.g., storyline, avatar choice, and choice in path to completion; Flowerday & Schraw, 2003) to direct attention and motivate learning (Landers & Callan, 2011) and enhance the learner experience (Yunyongying, 2014), whereas the other provided the information on text-based slides with voice over. Tutorial completion times were recorded within the LMS. As determined by timing several 'beta testers', the minimum tutorial completion time was 5 minutes, which was possible only if all content areas were skipped and all three quizzes were passed on the first try. Participants were also asked to indicate whether they completed the tutorial.

Academic Integrity Questionnaire. This questionnaire took three forms to measure engagement in and knowledge and attitudes about 24 academic integrity violations (Hughes & McCabe, 2006; Jurdi et al., 2011). In Form A, participants rated the frequency with which they had previously engaged in each violation on a 5-point scale [1 = *never* to 5 = *very often (more than 10 times)*]. Ratings were summed to create a *Cheating Index*, which could range from 24 (representing no academic dishonesty) to 120 (representing frequent academic dishonesty). In Form B, participants indicated if the statement represented an act of dishonesty (*yes, no, not sure*); the percentage of yes responses indicated greater knowledge of acts classified as violations. In Form C, participants rated the seriousness of each academic integrity violation on a 4-point scale (1 = *not serious* to 4 = *serious*), and ratings were averaged to create a *Perceived Seriousness Index*.

Approaches to Learning Scale. This six-item instrument measured use of study skills and strategies using Likert-type items (1 = *strongly disagree* to 5 = *strongly agree*; Jurdi et al., 2011). A *surface learning* factor was derived from responses to three items (e.g., "I think browsing around is a waste of time, so I only study seriously what is given out in class"). A *deep learning* factor was measured using three items (e.g., "I try to relate what I learned in

[1] Our original intention was to compare the effectiveness of the two tutorials; however, this was not feasible given the nature of the data collection as described in the results section.

one subject to that in another"). Composite scores for each factor were computed by summing the scores on the respective items.

Motivated Strategies for Learning Questionnaire (MSLQ) – Self-Efficacy for Learning and Performance Subscale. This subscale consists of eight items to measure self-appraisal of the ability to master a task (Pintrich, Smith, Duncan, & Mckeachie, 1991). Participants responded to items on a 7-point Likert scale (1 *= not at all true of me* to 7 *= very true of me*). An example of an item in this subscale is "I believe I will receive an excellent grade in this class." The average of the responses is calculated, with higher scores representing greater expectancy for success and self-efficiency (normative sample: $M = 5.47$, $SD = 1.14$). In their meta-analytic review of the MSLQ, Credé and Phillips (2011) support the notion that the motivational variables assessed by this instrument are related to learning strategies and academic performance.

Brief Version of the Big Five Personality Inventory (BFI-10). This inventory is a 10-item self-report questionnaire that measures five broad personality traits (*Extraversion*, *Neuroticism*, *Conscientiousness*, *Agreeableness*, and *Openness*) using a Likert-type rating scale (1 = *disagree strongly* to 5 = *agree strongly*; Rammstedt & John, 2007). To obtain scores for each trait, the response to one item is reverse coded and averaged with the response to a second item. The BFI-10 was adapted from the 44-item Big Five Personality Inventory and is suitable when time is limited (Rammstedt & John, 2007).

Demographic questionnaire. This questionnaire consisted of items to collect information about age, gender, first language, educational background, average grades earned over the past two years, and internal and external pressures experienced by students to achieve good grades (1 = *none*, 2 = *little*, 3 = *moderate*, 4 = *much*).

Results and discussion

Because the study data were largely non-normally distributed, non-parametric methods were deemed appropriate for the analyses. Frequencies, medians, and ranges are reported.

Cheating rates and perceptions of seriousness. Prior to examining the data for evidence of tutorial effectiveness, we calculated cheating rates in the sample and looked for relationships between Cheating Indices and other study variables. A cheating rate of 44.2% was estimated by coding participants as cheaters if they indicated cheating at least once on any single violation. The distribution of cheaters across gender was not evident [$\chi(1) = .04$, $p = .85$], but did vary across three age groups [$\chi(2) = 23.05$, $p < .001$]. We examined the cheating rates across three age groups: youngest (17-20-year-olds), middle (21-27-year-olds), and oldest (28-32-year-olds). More cheaters were found in the youngest group, and fewer in the middle and oldest groups ($p < .05$ for both comparisons; Table 2). Cheating rates per type of academic integrity violation were also estimated – the distribution of students engaged in serious cheating in written work (as defined by Hughes & McCabe, 2006) varied across age group [$\chi(2) = 6.11$, $p = .047$], with more cheaters in the youngest compared to the oldest group ($p < .05$; Table 2).

Significant age group differences in *Cheating Indices* were evident [$H = 13.70$, $p = .001$]. The youngest group cheated more often (*Mdn* = 29, *Range* = 22 – 46) than the middle (*Mdn* = 24, *Range* = 22 – 46) and oldest (*Mdn* = 24, *Range* = 23 – 47) groups [$U \geq 197.50$, $z \geq 2.28$, $p < .03$, $r \geq .30$, for both contrasts]. About 67% of participants indicated that they put "moderate" or "much" pressure on themselves to achieve high grades, and 52.3% reported that others put "moderate" or "much" pressure on them. Pressure from self was negatively correlated with Cheating Indices in cheaters [$r_s(37) = -.33$, $p = .04$], but pressure from others was positively correlated with Cheating Indices in the full sample [$r_s(88) = .24$, $p = .03$]. Openness to experience and neuroticism were positively correlated with Cheating Indices [$r_s(81) = .23$, $p = .04$ and $r_s(81) = .29$, $p = .009$, respectively]. Similar to previous findings (Jurdi et al., 2011), the relationship between Cheating and Perceived Seriousness Indices was significant in cheaters, such that the less serious participants thought the acts were overall, the more they had cheated in the past [$r_s(39) = -.56$, $p < .001$]. Neither gender [$U = 998.50$, $p = .76$, $r = .03$] or age [$H = 4.99$, $p = .08$] group differences were found in perceptions of seriousness of academic integrity violations.

Table 2

Overall Cheating Rates and Cheating Rates by Specific Academic Integrity Violation by Age Group and Study

	Study 1[a]			Study 2
Academic Integrity Violation	17-20-year-olds (*n* = 28) (%)	21-27-year-olds (*n* = 31) (%)	28-32-year-olds (*n* = 30) (%)	12.8-17.9-year-olds (*n* = 90) (%)
Overall Cheating Rates	**78.6**	**38.7**	**16.7**	**95.6**
Serious Test Cheating	**28.6**	**25.8**	**10.0**	**62.1**
Copying from another student during a test with his or her knowledge	25.0	22.6	6.7	42.0
Helping someone else cheat on a test	21.5	22.6	6.7	29.3
Using prohibited crib notes or cheat sheets during a test	21.5	19.3	10.0	14.8
Copying from another student during a test without their knowledge	21.4	9.7	6.7	39.8
Serious Cheating in Written Work	**46.4**	**29.0**	**16.7**	**77.0**
Copying a few sentences of material from an internet source without citing it	35.7	16.1	10.0	60.0
Turning in a paper copied from another student	17.8	3.2	10.0	12.4
Copying a few sentences of material from	28.5	6.4	10.0	50.0

a written source without citing it				
Turning in work done by someone else	21.4	12.9	6.7	7.8
Fabricating or falsifying a bibliography or reference list	28.5	3.2	6.7	24.4
Turning in a paper obtained in large part from a term paper "mill" or website that did charge a fee	17.9	0	10.0	5.6
Copying materials almost word for word from a written source and turning it in as your own	14.3	3.2	6.7	35.6
Turning in a paper obtained in large part from a term paper "mill" or website that did not charge a fee	10.7	0	10.0	10.1
Other				
Receiving unpermitted help on an assignment	60.7	29.0	13.3	52.2
Sharing an assignment with another student, so they have an example to work from	60.7	25.8	6.1	85.6
Working on an assignment with others when the instructor asked for individual work	50.0	32.4	6.6	62.2
Getting questions and answers from someone who has taken the test	46.4	22.6	6.7	44.9
Using a false excuse to obtain extension on a due date	39.3	13	6.7	37.8
Writing or providing a paper for another student	17.9	12.9	6.7	6.7
Providing a previously graded assignment to someone to submit as their own work	21.4	19.3	10.0	10.1
In a course requiring computer work, copying a friend's program rather than doing your own	28.5	6.5	6.7	41.1
Hiding library or course materials	28.6	6.5	6.7	17.8
Damaging library or course materials	25.9	0	6.7	18.0
Fabricating or falsifying data to complete a laboratory report	25.0	3.2	6.7	24.6
Altering a graded test to try to get additional credit	17.9	3.2	10.0	12.4

[a] In Study 1, 89 of the 95 students (93.6%) that consented to participate responded to items in the Academic Integrity Questionnaire from which we estimated cheating rates.

Overall, the cheating rate of 44% observed in this study is consistent with the lower end of the estimated prevalence reported in previous research (e.g., 49.7 - 93% of high school students; Galloway, 2012; Hughes & McCabe, 2006; Williams et al., 2010, and 18 - 81% of

post-secondary students; Birks et al., 2018; Hughes & McCabe, 2006; Ma, Mccabe, & Liu, 2013). We speculated, however, that the actual rate of academic dishonesty in our sample for Study 1 was underestimated. We suspected that a proportion of the participants responded dishonestly to survey items and/or consented primarily to acquire the incentive. Mazer, Amir, and Ariely (2008) suggest that new mediums of reward (in our case, e-gift cards) provide an opportunity for under-the-radar dishonesty in research studies. The combination of online participation and an incentive may have inadvertently created conditions that encouraged cheating behaviour within the research study itself (Mazar et al., 2008). Thus, we looked for evidence of dishonesty by examining short tutorial completion times and mismatches between these times and reports of tutorial completion. Seventy-seven participants clicked on the tutorial link in the LMS but did not complete it; 45 of these participants indicated that they did and 32 indicated that they did not (*Range of completion times*: 0 – 4.6 min). Only 15 participants completed the tutorial in 18.8 min on average (*SD* = 9.9, *Range* = 6.4 – 34.7 min). All 15 participants reported cheating at least once. These participants were younger (*M* = 19.5 years, *SD* = 2.8, *Range* = 17 – 25 years) than those who did not complete the tutorial (*M* = 25.1 years, *SD* = 4.4, *Range* = 18 – 32 years) [$t(30.06) = 6.21$, $p < .001$].

Tutorial effectiveness. For the 15 participants who completed the tutorial, knowledge ($Mdn_{pre,\ post}$ = 87.5%, 91.7%) and perceived seriousness ($Mdn_{pre,\ post}$ = 3.3, 3.8) of academic integrity violations increased significantly following tutorial completion [$T = 75.00$, $p = .04$, $r = .54$ and $T = 113.50$, $p = .002$, $r = .79$, respectively], but this was not the case for the participants who did not complete the tutorial [$T \leq 588.50$, $p \geq .80$, $r \leq .03$]. Thus, the brief educational intervention appeared effective for those who chose to complete it, but these shifts in knowledge and perceptions were not correlated with the individual difference factors that we measured. Given the small sample, we were limited in our interpretation of our findings so we modified our research protocol to address some of the study limitations and recruited a different sample of secondary students to participate in a second study.

Study 2

We sought to further explore whether an e-learning tutorial was effective in shifting students' perceptions of the seriousness of academic integrity violations in a different sample of secondary school (i.e., middle and high school) students. Because of participant accountability issues suspected in Study 1, we recruited students from local secondary schools and collected data in their schools during class time with the permission of parents, teachers, and principals for Study 2. This study protocol change was expected to increase the number of students who completed the academic integrity tutorial in its entirety, and would provide greater power for our analyses. As in Study 1, we were interested in examining the cheating rates in the sample of students and exploring the extent of the relationship between response biases and self-reported cheating behaviour. Scores derived from self-report social desirability scales can be used to determine whether survey responses represent actual behaviour or behaviours accepted by others (e.g., Miller et al., 2015). We anticipated that participants who over reported their engagement in socially desirable behaviours would have underreported participation in academic integrity

violations. Finally, as in Study 1, we sought to explore how individual difference factors contribute to greater benefits from completing an academic integrity tutorial. We expected that students with greater self-efficacy, use deeper approaches to learning, and/or engage in more collaborative learning may be more inclined to reflect upon the information presented in the tutorials and shift their perceptions of academic integrity violations.

Method

Participants. Ninety students (M_{age} *= 15.3*, *SD* = 1.5, *Range* = 12.8 - 17.9 years) enrolled in two private schools in Manitoba, Canada were recruited to participate in Study 2. Three teachers at these two schools and their principals consented to assist with recruitment of their secondary (i.e., middle and high) school students for the study and allowed data collection to occur during specified classes in their schools. Prior to the study sessions, consent forms were sent home with the students for parents/legal guardians to read and sign, and return to the teachers. On the day of testing, we provided students with unique usernames and passwords to login to the LMS. All students were required by their teachers to complete the surveys and the academic tutorial as part of their course requirements to learn about academic integrity; however, we only extracted and analyzed the data from those with parent/legal guardian consent and participant assent. Each participant received a $20 gift card at the end of the school day. See Table 1 for demographic characteristics of this sample. The JFREB at the University of Manitoba approved this study.

Materials and Procedure. The questionnaires and procedures for Study 2 were similar to those used in Study 1 with some exceptions. Two questionnaires were added [i.e., Children's Social Desirability Scale (CSD-S) and the MSLQ – Peer Learning and Help Seeking subscales; described below] and one was removed (i.e., Academic Integrity Questionnaire Form B) from the study. Some of the response options were modified in the demographic questionnaire (e.g., year of birth, grade in school) and the language in some surveys was simplified so that younger participants would be more likely to understand the questions and response options easily. Finally, only the game-based tutorial was used in this study.
Children's Social Desirability Scale (CSD-S). This 14-item scale was designed for use with children in grades 6-12 (Miller et al., 2015). Children respond with either a yes or no to each item. Each socially desirable response scored one point and were summed to create a CSD-S total score, which can range from 0 to 14. Higher scores indicated a greater tendency to respond in a socially desirable manner. Participants' biases were considered in the interpretations of the results from the analyses of the Cheating and Perceived Seriousness Indices.

MSLQ – Peer Learning and Help Seeking subscales. The Peer Learning subscale consists of seven questions designed to measure the tendency to collaborate with others and manage the support of others. An example of an item on this subscale is: "When studying, I often try to explain the material to a classmate or a friend." The Help Seeking subscale consists of eight questions designed to measure motivation and attitudes about their classes. An example of an item on this subscale is: "I ask the teacher to clarify concepts that

I don't understand well." Participants rated their behaviour on a 7-point Likert scale (*1 = not at all true of me* to *7 = very true of me*). Items for each subscale are averaged to produce composite scores (Pintrich et al., 1991). A single composite score can also be produced by averaging all 15 items; some researchers suggest that this is appropriate as the correlation between scores on these subscales is very high (Credé & Phillips, 2011).

Results and discussion

As in Study 1, we calculated cheating rates and examined the relationships between Cheating Indices and other study variables to characterize the participants in this sample. Data were analyzed using non-parametric tests.

Cheating rates and perceptions of seriousness. A cheating rate of 95.6% was estimated by coding participants as "cheaters" if they indicated committing at least one academic integrity violation. There was an equal distribution of cheaters across schools [$\chi(1) = .34$, $p = .56$], gender [$\chi(1) = .01$, $p = .93$], and age group [$\chi(2) = .22$, $p = .90$]. The *Cheating Indices* across three age groups (12-13-year-olds, 14-15-year-olds, 16-17-year-olds) were also comparable [$H = 4.14$, $p = .13$]. The lack of evidence for group differences in cheating rates and Cheating Indices is not surprising given the high estimated cheating prevalence overall. Next, we examined the relationship between social desirability scores and the Cheating Indices. A significant negative correlation between the two variables emerged [$r_s(86) = -.42$, $p < .001$], suggesting that the students who were more likely to respond in socially desirable ways were less likely to report engagement in academic cheating. Consistent with previous reports (see Paulhus & Dubois, 2015 for a review), Cheating Indices were negatively correlated with average grades earned over the past two years [$r_s(79) = -.26$, $p = .02$]. An estimated 92.6% of participants indicated that they put "moderate" or "much" pressure on themselves to achieve high grades, and 53% indicated that others put "moderate" or "much" pressure on them. Pressure from self or others was not significantly correlated with Cheating Indices [$r_s(79) \leq -.17$, $p \geq .13$]. The Agreeableness trait was negatively correlated with Cheating Indices [$r_s(63) = -.27$, $p = .03$].

The relationship between Cheating and Perceived Seriousness Indices was significant [$r_s(88) = -.50$, $p < .001$], such that those who perceived acts of academic dishonesty as less serious were more likely to have cheated more during their studies. There was no evidence of gender ($U = 512.00$, $z = -.23$, $p = .819$, $r = .03$) or age group ($H = 3.07$, $p = .22$) differences in perceptions of seriousness prior to completing the tutorial.

Tutorial effectiveness. Eighty-eight participants completed the tutorial; their ratings of perceived seriousness of academic integrity violations increased significantly following tutorial completion ($Mdn_{pre,\ post} = 3.46, 3.75$; $T = 2{,}664.00$, $p < .001$, $r = .76$). Next, degree of seriousness perception shifts was calculated by subtracting pre- from post-tutorial Perceived Seriousness Indices. There were significant differences in the degree of seriousness perception shifts across the three age groups ($H = 6.94$, $p = .03$). Stepdown follow-up analysis showed that the perceptions of the youngest (12-13-year-olds) and oldest (16-17-year-olds) participants changed more than the perceptions of the 14-15-

year-olds ($p < .05$). Grade differences ($H = 6.44$, $p = .04$) mirrored the age group differences, with perceptions of the students in grades 8 and 11 shifting more than the perceptions of grade 10 students ($p < .05$). There were no gender or school differences present in intervention effectiveness ($U \leq 670.00$, $p \geq .26$ for both comparisons). Similar shifts in perception were also observed for participants who indicated their first language was English compared those who indicated their first language was not English ($U = 677.00$, $p = .91$).

Correlations between the degree of seriousness perception shifts and the other composite variables that we calculated in this study are displayed in Table 3. Of note is the correlation between the degree of seriousness perception shifts and CSD – S [$r_s(80) = .307$, $p = .006$]. Students prone to providing socially desirable responses (or being less truthful) were impacted more by completing the tutorial than students who provided less socially desirable responses (or were more truthful). It could be argued that students who desire to be seen in the best possible light are more malleable and/or adaptive following an intervention such that they can improve upon the very trait that they strive for – integrity and social desirability (we come back to this point in the General Discussion). The degree of seriousness perception shifts were significantly correlated with the Cheating Indices [$r_s(82) = -.809$, $p < .001$]. Thus, the impact of the tutorial on attitudes about academic integrity violations was smaller for students who engaged more frequently in dishonest activities in their scholarly work.

Table 3
Correlations between the Degree of Shifts in Perception of the Seriousness of Academic Integrity Violations and Individual Difference Factors

		1	2	3	4	5	6	7	8	9	10	11	12
1	Degree of perception shifts	-											
2	Children's Social Desirability Scale (CSD-S)	.31**	-										
3	Cheating Index	-.81**	-.42**	-									
Approaches to Learning													
4	Surface learning	-.20	-.17	.24*	-								
5	Deep learning	.27*	.28*	-.27*	-.01	-							
Motivated Strategies for Learning Questionnaire (MSLQ)													
6	MSLQ – Self-efficacy	.20	.04	-.17	.13	.34**	-						
7	MSLQ – Help seeking	.16	.05	-.04	-.01	.15	.21	-					
8	MSLQ – Peer learning	.21	.08	-.09	-.30	.26*	.38**	.46**	-				
Big Five Inventory – 10 items (BFI-10)													
9	Openness to experience	-.05	.09	-.04	.02	.21	.12	.36**	.18	-			
10	Conscientiousness	-.10	-.08	.08	-.04	-.20	-.18	-.14	.09	-.13	-		
11	Extraversion	.21	.24	-.15	-.04	.31*	.39**	.46**	.44**	.24	.97	-	
12	Agreeableness	.35**	.09	-.27*	.03	.22	.45**	.37**	.39**	.03	-.10	.63**	-
13	Neuroticism	.05	.01	-.11	-.04	-.02	-.16	-.10	-.24	.02	-.45**	-.50**	-.44**

Note. n = 64-82. $^{*}p < .05$, $^{**}p < .01$

General Discussion

The primary goals of the present studies were to examine the effectiveness of an e-learning academic integrity tutorial with students enrolled in secondary school, and characterize those who benefit most from completing an intervention. In general, we found evidence that the academic integrity tutorial that we developed was effective. Participants' knowledge (Study 1) and perceptions about the seriousness of academic integrity violations (Studies 1 and 2) shifted significantly following completion of the brief educational intervention. In the second study, perception shifts were greatest for the youngest and oldest participants, for those who generally took a deeper approach to learning, and for those with higher levels of the agreeableness personality trait. Furthermore, higher cheating rates were observed in younger compared to older groups of participants, and that when not held accountable, participants (in our first study) took the opportunity to cheat within the study.

The evidence we found for intervention effectiveness is in line with the previously reported findings that e-learning tutorials about plagiarism avoidance increased post-secondary students' perceived knowledge about academic integrity and plagiarism (Jackson, 2006; Kirsch & Bradley, 2012; Liu, Lo, & Wang, 2013). Additionally, we observed age effects, specifically, the youngest participants appeared to have gained the largest benefits as a result of completing the intervention. This is valuable information as it serves as a reminder that early academic integrity education is vital to student development. Because the adolescent years promise both positive and negative outcomes "depending on the kind of care and opportunities that adults . . . afford young people at home [and] in school," middle school educators have a tremendous responsibility to "cultivate positive youth development" (Roeser, Eccles, & Sameroff, 2000, p. 446). This includes supporting the development of appropriate decision-making skills and honesty in scholarly activities. Tutorials about academic integrity can support these efforts if they serve as a catalyst for deeper discussions and encourage students to ask their teachers clarifying questions when expectations about studying and schoolwork are unclear. Further, by encouraging thoughtfulness about scholarly activities and helping students to make connections between their honest behaviours and learning early in their academic careers, teachers may find that students take fewer shortcuts in their studies. While we limited our investigation to changes in knowledge, perceptions, and attitudes, there may be longer term benefits as a result of completing the intervention, especially when combined with other teaching-learning activities (see Dembo & Eaton, 2000 for discussion of learning strategies).

Similar to previous findings (Jurdi et al., 2011), more academic cheating was associated with the perception that dishonest scholarly activities were less serious in our samples of participants. Given this, shifting students' perceptions about the severity of academic integrity violations using a tutorial may also support behaviour change; however, one-off academic integrity tutorials should not be relied on as the sole source of information to promote academic integrity and reduce academic dishonesty. In an effort to further

educate secondary school students, we designed a post-tutorial workbook consisting of reflective activities to stimulate thinking about the importance of acting with integrity. The teachers of the students in our second study planned to use the workbook to encourage group discussion of the concepts in the tutorial to gain a deeper understanding of the activities they should avoid and those they can engage in to learn and be successful in their schoolwork. In future work, it would be interesting to examine the impact of activities that compliment academic integrity tutorials on behaviour change in students. In addition to continued learning about academic integrity, educators must create meaningful and authentic learning opportunities in other content and skill areas so that students are encouraged to be directly involved in their learning processes rather than being "passive recipients of knowledge" (Zivcakova & Wood, 2014, p. 195).

Our finding that students who scored higher on the deep approach to learning factor were affected more positively by the intervention fits with the profile of a deep learner. Deep learners share an intrinsic interest and wish to maximize their learning, whereas surface learners have relatively narrow learning targets often accompanied by a fear of failure (Biggs, Kember, & Leung, 2001). The definitions of deep and surface learners are further supported by our findings that higher deep learning scores were associated with less academic cheating, and higher surface learning scores were associated with more cheating. Additionally, the correlations between self-efficacy and deep learning scores, and the fact that higher scores on these measures were associated with less academic dishonesty are consistent with prior research showing that individuals with high self-efficacy "engage in and persist with learning behaviors that maximize the degree to which learning occurs" (Credé & Phillips, 2011, p. 337). Although determining the characteristics of the students who benefit most from an educational intervention is important, characterizing those students who gain less is key to improve teaching-learning resources. To this end, future academic integrity intervention research should continue to pursue motivators that play a role in creating a shift in students' understanding and appreciation for academic integrity.

In addition to the individual differences in approaches to and motivation for learning, we found a positive correlation between the agreeableness personality trait and greater shifts in perceptions of seriousness of academic dishonesty following tutorial completion. This finding makes sense given that students high in agreeableness tend to cooperate/comply with and assist others in order to maintain harmony (Mccrae & Costa, 1987), and are more willing to make an effort in learning in response to external demands (Vermetten, Lodewijks, & Vermunt, 2001) (Bidjerano & Dai, 2007). In the work setting, employees described as agreeable (and conscientious and extraverted) are strongly motivated to improve their work through continued training (Kueh & Ahmad, 2014; Naquin & Iii, 2002). Thus, it is possible that in our participants' willingness to learn new information about academic integrity resulted in shifts in perceptions in order to maintain positive relationships with other people, such as their parents and teachers. In the future, it would be interesting to examine the relationship between agreeableness and learning about

academic integrity more closely in a larger sample and look for other factors that mediate this relationship.

As part of our investigation of tutorial effectiveness, we collected data on cheating to understand the previous scholarly behaviours of our participants. The estimated cheating rates in our samples were relatively high but in line with previous reports of middle and high school (e.g., Galloway, 2012; McCabe & Pavela, 2004 in Strom & Strom, 2007), university, and college students (e.g., Birks et al., 2018; Ma et al., 2013). In middle school, the rate of cheating in written work (e.g., cut-and-paste plagiarism) might be higher if students have not yet learned the citing and referencing skills expected in later studies. We also found interesting correlations between cheating behaviour and certain personality traits. For example, students who were more open to experience and neuroticism (Study 1) reported more cheating and those who were more agreeable reported engaging in less cheating (Study 2). The correlation between the extent of cheating behaviour and agreeableness in our study is a new finding as previous research has found weak evidence for this association. Neuroticism often receives more attention in research on academic dishonesty as evidence suggests that it is a better predictor of scholastic cheating than other personality traits (Nathanson et al., 2006; Williams et al., 2010).

Somewhat surprisingly, we calculated a relatively high rate of contract cheating in our samples; 10 – 18% of participants (depending on the specific sub-sample) reported that they had turned in papers obtained from 'paper-mill' and 'tutoring' websites. These rates are higher than the averages of 2% and 3.5 – 6.9% reported previously for high school (Sisti, 2007) and higher education (Curtis & Clare, 2017; Mccabe, 2005; Newton, 2018), respectively. Given these previous prevalence estimates (specifically the estimate of 3.5%), Eaton (2018) suspects that well over 70,000 post-secondary students in Canada are engaging in contract cheating at any given time. Contract cheating is a particularly disturbing form of academic dishonesty as it suggests "deliberate, pre-planned, and intentional" (Newton, 2018, p. 2) deception during the assessment process. Even more disturbing is that many students who have engaged in this type of academic integrity violation will decide to submit another purchased paper. Indeed, Curtis and Clare (2017) found that 62.5% of university students who had previously chosen to purchase papers for submission were repeat offenders. Prevalence estimates of contract cheating in secondary schools are rarely reported in the peer-reviewed literature (to our knowledge), and our findings suggest that the problem needs to be studied further and steps must be taken to address this problem well before students enter middle and high school. An important challenge for educators is to make continued and deliberate efforts to detect work that has not been completed by the student being assessed. Being familiar with individual student's work is necessary so that irregularities will be noticed more easily (Eaton, 2018; Rogerson, 2017) and assessment will be fair and appropriate. Rogerson (2017) further stresses revisions or creation of new assessments for each offering of a course, and checking file-sharing websites for matches on assessment questions.

Limitations and Future Directions

While the results of the present studies provide evidence for the effectiveness of educating students about academic integrity, we acknowledge several limitations of this research. First, we collected students' perceptions of the seriousness of violations of academic integrity before and after tutorial completion, but did not examine changes in knowledge or skills, transfer of newly learned knowledge and skills to another setting, or longer-term positive impacts on students' learning and success. The next step in tutorial evaluation would be to survey students at a later date to determine if shifts in perceptions remained stable and engagement in inappropriate activities in scholarly work decreased. Although well-developed self-report measures are efficient and valid (Paulhus & Vazire, 2007), collecting other sources of information can provide a more well-rounded picture of changes in knowledge, understanding, and behaviours with regards to academic integrity. For example, interviewing teachers and parents about their students' engagement in academic integrity violations and comparing the quality (or "cheating") of students' assignments before and after an educational intervention would be important to assess longer term impacts on students' understanding of the concepts introduced in the tutorial. A second limitation is that we did not explore the influence of the learning environment on the effectiveness of the academic integrity tutorial. Given that post-secondary students are less likely to see the importance of being honest in their scholarly activities when educators ignore the cheating behaviour (McCabe & Pavela, 2004), it would be interesting to ask K-12 teachers and teachers who support learners in alternative education centres about the importance they and their schools place on academic integrity, and the role they play in fostering integrity and dealing with academic integrity violations. Examining specific teacher and institutional characteristics may shed additional light on the degree of tutorial effectiveness. Orosz et al. (2015) reported that instructor characteristics had an indirect effect on the occurrence of academic integrity violations in a sample of 267 third-year psychology students in the UK, such that the lack of enthusiasm shown by instructors was linked to decreased intrinsic motivation and more cheating behaviours. Thus, investigating whether the enthusiasm-motivation relationship holds in the primary and secondary school setting and how this relationship affects intervention effectiveness would provide valuable information for the continued improvement of learning activities to promote academic integrity.

A third limitation was the low tutorial uptake in the first of our two studies. We found evidence that a significantly large proportion of participants were dishonest within the study itself. As we described above, the online testing environment and the honorarium may have created conditions that encouraged participants to take shortcuts. While this was discouraging, it prompted us to collect information on participants' social desirability biases in our second study. Here, we found moderate correlations between the tendency to report more inflated self-images and less academic cheating, and greater shifts in the perception of the seriousness of academic dishonesty. These associations may suggest that some participants were dishonest in their reporting of their previous academic integrity violations; this possibility must be considered when interpreting our findings. Exploring

participants' dishonesty in research, especially in academic integrity studies, may be an interesting avenue for future research. Using theories of self-concept maintenance, for example, may provide a useful framework for explaining dishonest research participation. Mazar et al. (2008, abstract) suggest that "people typically engage in dishonest behaviors and achieve external benefits from dishonesty, but only to the extent that their dishonest acts allow them to maintain a positive view of themselves in terms of being honest". Thus, it would be interesting in intervention research to examine participants' behaviours in various testing conditions, and determine the influence of the specific language used in study instructions ("Please don't be a cheater in this research study" vs. "Please don't cheat in this research study") on the degree of dishonesty (e.g., Bryan, Adams, & Monin, 2013).

Conclusions

The evidence that e-learning tutorials about academic integrity are effective is emerging, in terms of short-term attitude shifts as we have shown in the present studies, and perceived knowledge increases as reported elsewhere (Jackson, 2006; Kirsch & Bradley, 2012; Liu et al., 2013). However, to strengthen the positive effects of academic integrity education, these educational interventions should not be used in isolation. Other strategies to support the content of these tutorials and to promote a culture of academic integrity in the school are also necessary to prevent academic integrity violations. Moreover, testing the effectiveness beyond attitude shifts and perceptions of knowledge and examining long-term student outcomes is important to advance the development of academic integrity tutorials and other educational interventions. Our findings are also significant in that, to our knowledge, a Canadian study in this area has not been previously published. Our work directly answers the call made by Canadian researchers to conduct research on the effectiveness of educational interventions for promoting academic integrity in Canada (Stoesz & Yudintseva, 2018), and to examine academic integrity issues more broadly in Canada (Eaton & Edino, 2018).

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