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Mediational role of academic motivation in the association between school self-concept and school achievement among Indian adolescents in Canada and India

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Abstract The present study examined the mediational role of academic motivation in the association between school self-concept and school achievement among 355 Indian immigrant adolescents in Canada and 363 Indian adolescents in India. Surveys were administered among Grades 9–12 students in Canada and India to assess their academic self-concepts, academic motivation, and academic achievement. Bootstrapped tests of simultaneous multiple indirect effects were conducted to determine the unique ability of each putative mediator—intrinsic motivation, extrinsic motivation, and amotivation—to account for the effect of school self-concept on overall school GPA for Indian immigrant adolescents in Canada and Indian adolescents in India. Mediational analyses revealed the mediational roles of both intrinsic and extrinsic motivation in the association between school self-concept and school achievement for Indian immigrant adolescents in Canada, while intrinsic motivation solely mediated the relations between school self-concept and school achievement for Indian adolescents in India. Amotivation was not a significant mediator for both the Indian immigrant and Indian adolescents. Implications of the findings are discussed.

Keywords Academic motivation · School self-concept · School achievement · Indian immigrant adolescents · Indian adolescents · Mediation · Bootstrapping · Canada · India

1 Introduction

Although a growing body of research has examined specifically the relations between academic self-concept and academic achievement, and the relations between

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academic motivation and academic achievement among school children and youth, there is sparse research on the relations among academic self-concept, academic motivation, and academic achievement. In particular, there is a dearth of research on the mediating role of academic motivation in the relations between school self-concept and school achievement among school children and youth. Because students' academic self-concepts and academic motivation may affect their economic success, long-term health, and well-being (Organization for Economic Cooperation and Development [OECD] 2003), it is imperative to examine the relations among school self-concept, academic motivation, and school achievement for children and youth.

Hence, the purpose of the present study was to examine the mediating role of academic motivation in the relations between school self-concept and school achievement for Indian immigrant adolescents in Canada in comparison to their counterparts in India. Specifically, the study addressed the research question: To what extent does academic motivation mediate the relationship between school self-concept and school achievement for Indian immigrant adolescents in Canada and Indian adolescents in India?

1.1 Academic self-concept and academic achievement

According to Marsh and Köller (2003), the major research question in the study of academic self-concept is: whether academic self-concept causes academic achievement or academic achievement causes academic self-concept. In the voluminous literature on self-concept, there are three major theoretical models regarding the causal ordering between academic self-concept and academic achievement: the self-enhancement model (see Calsyn and Kenny 1977), the skill development model (see Calsyn and Kenny 1977), and the reciprocal effects model (see Marsh 1990).

The self-enhancement model posits that the primary causal path is from academic self-concept to academic achievement (Calsyn and Kenny 1977; Green et al. 2006; Valentine and Dubois 2005). Therefore, according to the self-enhancement model, effective self-concept enhancement interventions designed to improve self-perceptions by eliminating self-defeating thoughts and other negative behaviours might help to improve academic achievement (Freund and Rich 2005; Guay et al. 2010; Marsh and Scalas 2011). In contrast, according to the skill development model, the predominant causal path is from academic achievement to academic self-concept (Calsyn and Kenny 1977; Green et al. 2006). Hence, the focus of the skill development model is "on academic skill improvement, on the assumption that such intervention will result in greater academic achievement and thus improved self-perception" (Freund and Rich 2005, p. 551). Several research studies have examined the relations between academic self-concept and academic achievement utilizing the self-enhancement and skill development models (see Baumeister et al. 2003, 2005; Pinxten et al. 2010; Valentine and Dubois 2005). However, neither the self-enhancement model nor the skill development model has found adequate empirical support (Pinxten et al. 2010).

Marsh et al. criticized both the self-enhancement and skill development models as too simplistic, methodologically unsound, and inconsistent with self-concept theory (see Marsh 1990; Marsh and Scalas 2011). Hence, Marsh (1990) proposed an integration of these two theoretical models—the reciprocal effects model of academic

self-concept. The reciprocal effects model postulates that academic self-concept and academic achievement are reciprocally related and mutually reinforcing (Marsh and Craven 2005). Hence, improved academic self-concepts would lead to better academic achievement, and improved academic achievement would lead to better academic self-concepts (Marsh and Craven 2005). Thus, Marsh and Martin (2011) suggest:

> If teachers enhance students' academic self-concepts without improving achievement, then the gains in self-concept are likely to be short-lived. However, if teachers improve students' academic achievement without also fostering students' self-beliefs in their academic capabilities, then the achievement gains are also unlikely to be long lasting. If teachers focus on either one of these constructs to the exclusion of the other, then both are likely to suffer. Hence, according to the reciprocal effects model, teachers should strive to improve simultaneously both academic self-concept and achievement. (p. 72)

Tremendous advances in theoretical models and instrumentation have immensely helped self-concept researchers to rigorously examine the association between academic self-concept and academic achievement. As a result, a substantial body of research has demonstrated theoretical, methodological, and empirical support for the reciprocal effects model (see Marsh and Craven 2006; Marsh and Martin 2011, for reviews). Empirical support for the reciprocal effects model would require statistically significant paths leading from prior self-concept to subsequent achievement, and statistically significant paths leading from prior achievement to subsequent self-concept (Marsh and Martin 2011). Empirical studies that found support for the reciprocal effects model utilized sound and diverse methodological designs, including longitudinal panel designs (e.g., Guay et al. 2003; Marsh 1990; Marsh and O'Mara 2008) and meta-analytic designs (e.g., Valentine and Dubois 2005; Valentine et al. 2004).

In their meta-analysis of 55 longitudinal studies, Valentine et al. (Valentine and Dubois 2005; Valentine et al. 2004) examined the relations between academic self-beliefs and academic achievement. After controlling for the effects of prior achievement, they found a highly significant positive effect of prior academic self-beliefs on subsequent achievement. The findings of meta-analysis provided empirical support for predictions based on the reciprocal effects model of academic self-concept over those derived from the other two models—self-enhancement and skill development models.

Recently, Marsh and O'Mara (2008) longitudinally examined the reciprocal effects among academic self-concept, self-esteem, academic achievement, and post-secondary educational attainment using five waves of data from the Youth in Transition (YIT) database, a nationally representative database of 10th grade boys in U.S. public high schools. Consistent with the predictions from the reciprocal effects model, the study found positive reciprocal effects between academic self-concept and academic achievement. While the relations among self-esteem, academic achievement, and post-secondary educational attainment were found to be weak and inconsistent, the results of the study revealed positive reciprocal effects between academic self-concept and post-secondary educational attainment.

Although an abundance of literature has demonstrated the robustness of the reciprocal effects model, support for the model has been based largely on responses by

students from Western countries, particularly English-speaking students in Australia and the United States (see Marsh and Martin 2011). Only a small body of empirical research has examined the cross-cultural/national generalizability of the reciprocal effects model. The relationship between academic self-concept and academic achievement was found to be reciprocal and mutually reinforcing among students in highly individualist cultures such as Canada (e.g., Guay et al. 2003) and Germany (e.g., Marsh and Köller 2003; Marsh et al. 2001, 2005), and among students in highly collectivist cultures such as China (e.g., Yeung and Lee 1999) and Hong Kong (e.g., Marsh et al. 2002). However, there has been no research to date that examined the relations between academic self-concept and academic achievement for school children in a moderately collectivist culture—India (Supple et al. 2009).

Guay et al. (2003), employing a multicohort–multioccasion research design, evaluated the developmental hypotheses about the causal ordering of academic self-concept and academic achievement for 385 French-speaking elementary school children in a highly individualist culture, Canada. The findings of the study indicated the effect of academic achievement on academic self-concept and the effect of academic self-concept on academic achievement, thereby supporting the reciprocal effects model of academic self-concept. Likewise, Marsh et al. (2005), using longitudinal data from two nationally representative samples of 7th grade students in another individualist country—Germany, investigated the reciprocal effects among academic self-concept, interest, grades, and standardized test scores. They found that the effect of prior self-concept on subsequent math interest, school grades, and standardized test scores was significant. However, prior math interest had a trivial effect on subsequent math self-concept.

Employing a longitudinal multilevel modelling approach, Marsh et al. (2002) evaluated the causal ordering models for 7,802 students from 56 high schools in a highly collectivist culture, Hong Kong. Even after controlling for the effects of prior self-concept, the study found significant positive effects of prior academic achievement on subsequent academic self-concept for adolescent students in Hong Kong. Moreover, prior academic self-concept was positively related to subsequent academic achievement, after controlling for the effects of prior academic achievement.

Academic self-concept research is considered an important component of academic motivation research (Cokley 2003, 2007). Moreover, Byrne (1984, 1996) posits that academic self-concept has motivational properties that might affect subsequent academic achievement. In other words, high academic self-concept may play a motivational role, which, in turn, may lead to increased academic achievement may lead to increased academic achievement (Byrne 1984, 1996). Therefore, Green et al. (2006) argue that it is critically important to develop an all encompassing framework to examine the combined and unique effects of both self-concept and motivation on each other and subsequent academic achievement.

1.2 Academic motivation and academic achievement

Even though researchers have used diverse motivational approaches, such as attribution theory (Weiner 1979), expectancy-value theory (Eccles 2005; Eccles and Wigfield 2002; Wigfield and Eccles 1992, 2000), achievement goal theory (Maehr and Zusho

2009), and self-efficacy theory (Schunk and Pajares 2009) to examine the relationship between academic motivation and academic achievement, one perspective that appears particularly promising and pertinent for the study of the association between academic motivation and academic achievement is Deci and Ryan (1985, 1991, 2000) motivational approach—Self-Determination Theory (SDT). Indeed, this theoretical perspective on motivation has generated a considerable amount of research in the field of education, and has been used extensively to better understand educational outcomes (see Niemiec and Ryan 2009; Ryan and Deci 2009; Ryan and Weinstein 2009).

SDT is a "macro-theory of human motivation, emotion, and development that takes interest in factors that either facilitate or forestall the assimilative and growth-oriented processes in people" (Niemiec and Ryan 2009, p. 134). Motivation, according to SDT, is multidimensional in nature (Deci and Ryan 2000). The multidimensional motivation orientation encompasses three global types of motivation: intrinsic motivation, extrinsic motivation, and amotivation (Deci and Ryan 1985, 2000, 2008). Of these, intrinsic motivation and extrinsic motivation are the two primary types of motivated academic behaviour (Cokley 2003). Deci and Ryan (2002) posit that "intrinsically motivated behaviours are those whose motivation is based in the inherent satisfactions of the behaviours per se, rather than in contingencies or reinforcements that are operationally separable from those activities" (p. 10). Initially, motivation theorists argued that intrinsic motivation was unidimensional in nature (Vallerand and Ratelle 2002). Later, Vallerand et al. (Vallerand et al. 1989; Vallerand et al. 1992; Vallerand et al. 1993) proposed a tripartite taxonomy of intrinsic motivation: intrinsic motivation to know, intrinsic motivation to accomplish things, and intrinsic motivation to experience stimulation.

Extrinsic motivation, in contrast, "refers to a broad array of behaviours having in common the fact that activities are engaged in not for reasons inherent in them, but for instrumental reasons" (Vallerand and Ratelle 2002, p. 42). Because extrinsic motivation is a multidimensional construct, SDT postulates that extrinsically motivated behaviours are characterized by four types of extrinsic behavioural regulation: external regulation, introjected regulation, identified regulation, and integrated regulation (Deci and Ryan 2002). Moreover, SDT maintains that these four types of extrinsic behavioural regulation can be situated along a self-determination continuum, with external regulation representing a complete lack of self-determined motivation and integrated regulation representing the most self-determined form of extrinsic motivation (Ryan and Deci 2009).

The final concept posited by SDT—amotivation—has the lowest level of autonomy on the self-determination continuum. Amotivated behaviours—lack of either intrinsic or extrinsic motivation—are nonmotivated behaviours (e.g., "I don't know why I go to school; I can't understand what I am doing in school"; Vallerand et al. 1992; Vallerand and Reid 1990). Thus when students are amotivated, they may not perceive contingencies between outcomes and their own actions (Vallerand et al. 1992).

Although a substantial body of research has examined the relations between academic motivation and academic achievement, only a few studies have explored the relations between academic motivation and academic achievement for school children from the stance of SDT. Fortier et al. (1995), for example, tested a structural motivational model of school performance based on the integration of SDT and

Cognitive Evaluation Theory (CET) for 263 French-speaking secondary students in Canada. The results of the study provided support for their proposed motivational model of school performance. Specifically, adolescents' perceived academic competence and perceived academic self-determination positively influenced their autonomous academic motivation, which, in turn, had a positive effect on adolescents' academic achievement.

Similarly, Miserandino (1996) assessed the effects of perceived competence and autonomous motivation on academic engagement and academic achievement for 77 elementary school children in the United States. Those children who had higher perceived competence and autonomous motivation were more engaged in school and academics than their counterparts who had lower perceived competence and autonomous motivation. Moreover, even after controlling for the effects of prior standardized achievement scores, both perceived competence and autonomous motivation predicted academic achievement for elementary school children.

In two studies using a prospective design, Guay and Vallerand (1997) examined the relations among perceived competence, autonomy, and self-determined school motivation, and the effect of self-determined school motivation on academic achievement for 9th and 10th grade French-speaking students in Canada. Results from both the studies supported the motivational model of academic achievement based on SDT. Adolescents' perceived competence and autonomy positively influenced their self-determined school motivation. Further, adolescents' self-determined school motivation predicted their academic achievement even after controlling for prior achievement. Employing a person-centered approach, Ratelle et al. (2007) explored adolescent students' profiles regarding autonomous, controlled, and amotivated types of motivation, and tested whether or not profile groups differed on academic outcomes. Students characterized by high levels of autonomous motivation and low levels of controlled motivation displayed better academic outcomes than students characterized by low levels of autonomous motivation and high levels of controlled motivation.

The findings of these studies suggest that students tend to learn better when they are autonomously or intrinsically motivated. However, these studies were conducted in highly individualist cultures—Canada and the United States, and the research participants were primarily White students. Hence, critics of SDT have challenged the cross-cultural/national generalizability of SDT (see Cross and Gore 2003; Iyengar and Lepper 1999; Markus et al. 1996; Murphy-Berman and Berman 2003). In particular, critics of SDT posit that SDT constructs such as autonomy and autonomy-support are the products of individualist cultures, but are not important in collectivist cultures (see Markus et al. 1996). However, the proponents of SDT propound the universal role of motivational autonomy in human functioning and academic learning (see Chirkov 2009).

To contest the claims of the critics of SDT, a few studies have investigated the cross-cultural/national generalizability of SDT in the context of students' academic learning. For example, Vansteenkiste et al. (2005) found among early adolescents in China that greater autonomous academic motivation was associated with more adaptive learning attitudes, greater academic success, and higher personal well-being, whereas greater controlled motivation was associated with maladaptive learning attitudes, higher drop-out rates, and ill-being. More recently, Jang et al. (2009) found similar results

among adolescents in South Korea—high levels of autonomy, competence, and relatedness were associated with enhanced school outcomes, while low levels of autonomy and competence were correlated with poor student outcomes. However, no study to date has examined the relations between academic motivation and academic achievement using an SDT perspective for adolescent students in India. Hence, it is of critical importance to examine the generalizability of SDT in the context of students' learning in a moderately collectivist culture like India.

Recently, Guay et al. (2010) tested the relationships among academic self-concept, autonomous academic motivation, and academic achievement for 925 French-speaking adolescent students in Canada using a longitudinal design. Specifically, Guay et al. attempted to determine whether or not autonomous academic motivation would mediate the relation between academic self-concept and academic achievement, and academic self-concept would mediate the relation between autonomous academic motivation and academic achievement. They also tested the additive effects of both autonomous academic motivation and academic self-concept on academic achievement. In line with SDT, autonomous academic motivation mediated the relation between academic self-concept and academic achievement. Nonetheless, the study found little support for the other two hypotheses.

In summary, a substantial body of research has explored separately the relations between academic self-concept and academic achievement, and the relations between academic motivation and academic achievement. As well, a small body of research has examined the relations among academic self-concept, autonomous motivation, and academic achievement. However, such studies were conducted primarily in individualist cultures, and the research participants were predominantly Caucasian students. Moreover, no research to date has specifically investigated the mediating effect of academic motivation on the relations between school self-concept and school achievement in a moderately collectivist culture, India. A better understanding of the relations among school self-concept, academic motivation, and school achievement may help educators in Canada and India to develop appropriate educational interventions for enhancing these adolescents' school engagement and achievement. Hence, it is critical to examine the relations among these important educational and psychological constructs for Indian immigrant adolescents in Canada and Indian adolescents in India.

2 Method

2.1 Participants

Separate samples were drawn from secondary students in Canada and India. Participants in the Canadian sample comprised of 355 Grades 9–12 Indian immigrant adolescents from secondary schools in Ontario (male = 179; female = 176), who immigrated to Canada from Kerala, one of the states in India. Participants in the Indian sample consisted of 363 Grades 9–12 students (male = 192; female = 171) from English medium secondary schools in Kerala, India, which had similar infrastructural facilities to the schools in Ontario. These schools in Kerala served students from a predominantly

middle to upper-middle class socio-economic status as did the schools in Ontario. The age of the participants in the Canadian sample ranged from 16 to 19 years, with a mean age of 16.88 years (SD = .89). The age of the participants in the Indian sample ranged from 13 to 18 years, with a mean age of 16.04 years (SD = 1.16).

2.2 Procedures

After obtaining clearance from the university research ethics board, I contacted the Indian community centres/associations across Ontario. I explained the study to the concerned authorities of Indian community centres/associations, and they agreed to help me in collecting data from Indian adolescents, who immigrated to Canada from Kerala, India. The letter of information, the letter of consent, and the survey questionnaires were handed out to the Indian immigrant adolescents through the Indian community centres/associations. Students whose parents agreed for them to participate and who themselves agreed to participate in the study completed the research measures. I collected the sealed envelopes containing the completed research measures from the Indian community centres/associations.

In India, I contacted the principals of five secondary English medium schools in Kerala, India. Of these, three secondary schools agreed to participate in the study. Upon approval by the principals and regular classroom teachers, I went to individual classrooms and explained the study to prospective research participants using my recruitment script. A hard copy of the recruitment script was also handed out to the students. Interested participants were given letters of information and consent forms. Students whose parents agreed for them to participate and who themselves agreed to participate in the study completed the research measures in the classroom setting. Students who elected not to participate in the study were taken by teachers to other areas and were assigned work.

2.3 Measures

2.3.1 Demographic questionnaire

The demographic questionnaire asked respondents to report their age, gender, country of origin, and current overall grades in school. Participants reported their overall school GPAs on a 5-point scale, ranging from 5 = *A* (Mostly 90s) to 1 = *F* (Mostly 50s).

2.3.2 Self-Description Questionnaire-II

School self-concept was measured using items (10 items) drawn from the Self-Description Questionnaire-II (SDQ-II; Marsh 1992). The SDQ-II was developed for junior high and high school students in Grades 7–10; however, it is appropriate for students in Grades 7–12. The SDQ-II contains 102 items to measure self-concept in adolescents using 11 subscales. The three academic subscales are mathematics, verbal, and general school; the seven non-academic subscales are physical ability, physical appearance,

opposite-sex relations, same-sex relations, parent relations, honesty-trustworthiness, and emotional stability. The SDQ-II also contains one general self-concept subscale. All 102 items are measured on a 6-point Likert-type scale, ranging from 1 = *false* to 6 = *true*. Half of the items for each subscale are negatively worded, and these items are intended to reduce positive response bias. Marsh (1992) reported measures of internal consistency for SDQ-II scores for a sample of 5,494 students in Grades 7–12. Internal consistency ranged from .83 to .91 for scores on all 11 subscales (Marsh 1992). In the present study, Cronbach's alphas were used to assess the internal consistency of the school self-concept scale for the whole sample ($\alpha = .82$), Indian immigrant sample ($\alpha = .81$) and Indian sample ($\alpha = .82$).

2.3.3 Academic motivation scale—high school version

Academic motivation was measured with the Academic Motivation Scale–high school version (AMS; Vallerand et al. 1992). The AMS is the English translation of the Echelle de Motivation en Education (Vallerand et al. 1992; Vallerand et al. 1993). Based on SDT, this 28-item instrument is divided into seven subscales, reflecting one subscale of amotivation, three ordered subscales of extrinsic motivation (external, introjected, and identified regulation), and three distinct, unordered subscales of intrinsic motivation (intrinsic motivation to know, to accomplish things, and to experience stimulation). The items are rated on a scale ranging from 1 = *does not correspond at all* to 7 = *corresponds exactly*. Each subscale consists of four items; thus subscale scores could range from 4 to 28. A high score on a subscale indicates high endorsement of that particular motivation.

Several empirical studies investigating issues related to motivation have used both the French (e.g., Guay et al. 2003) and English (e.g. Areepattamannil and Freeman 2008; Cokley 2000) versions of the AMS scale. Furthermore, numerous studies have explored the measurement properties of the AMS (e.g., Barkoukis et al. 2008; Cokley 2000; Cokley et al. 2001; Fairchild et al. 2005; Vallerand et al. 1992; Vallerand et al. 1993). Vallerand et al. (1992) reported that Cronbach's coefficient α for the subscales ranged from .83 to .86, with the exception of the identified subscale of extrinsic motivation, which had an internal consistency of .62. In addition, internal consistency for the subscales ranged from .60 to .86 with another English-speaking sample (Vallerand et al. 1993). Vallerand et al. hypothesized that a simplex pattern would be revealed among the ordered subscales of the AMS as one moved along the motivation continuum. This continuum represents an 'index of relative autonomy' as perceived by the individual (Deci et al. 1991). Examination of correlations of the subscales and correlations between the subscales and motivational antecedents and consequences provided support for construct validity (Vallerand et al. 1993; Cokley et al. 2001).

Although Areepattamannil and Freeman (2008), Cokley (2000), and Fairchild et al. (2005) found limited support for the simplex structure of the AMS, Cokley et al. (2001), consistent with Vallerand et al. (1992) findings, found support for the seven-factor structure of the AMS. Whereas Cokley et al. (2001) findings provided only partial support for the construct validity of scores from the AMS, Areepattamannil and Freeman (2008) and Fairchild et al. (2005) reported adequate model fit for the seven-factor model and adequate reliability for the seven subscales ($.77 \leq \alpha \leq .90$).

Recently, Barkoukis et al. (2008) reproduced the seven factor structure proposed by Vallerand et al. (1992). Moreover, Barkoukis et al. found sufficient evidence to support the reliability and the construct and concurrent validity of the AMS. In short, studies have provided evidence on the reliability and factorial, construct, and concurrent validity of the scale.

Nevertheless, researchers recommend further investigation of the properties of scores from the AMS with more diverse samples (e.g., Fairchild et al. 2005). Therefore, confirmatory factor analyses (CFAs) were conducted in the present study to test the fit of the seven-factor structure for the whole sample, the Indian immigrant sample, and the Indian sample. The CFA performed on the whole sample indicated that the seven-factor model did not fit the data well ($\chi^2 = 2,918.80$, $df = 336$, $p < .001$; SRMR = .17; RMSEA = .11; CFI = .86; TLI = .85). Each of these fit indices implies poor fit. Similarly, the CFAs performed on the Indian immigrant and the Indian samples also revealed that the seven-factor model did not fit the data well. Therefore, exploratory factor analyses (EFAs) using maximum likelihood (ML) with oblique rotation were conducted to examine the factor structure and the psychometric properties of the AMS items. If data are relatively normally distributed, ML is considered as the best method of factor extraction (see Fabrigar et al. 1999).

The latent root criterion (eigenvalue > 1; Kaiser 1960), the scree test (Cattell 1966), and parallel analysis (Horn 1965; Turner 1998) were used to extract meaningful factors that accounted for the maximum amount of common variance (see Fabrigar et al. 1999). Items with factor loadings less than .30 were eliminated (see Pedhazur and Schmelkin 1991). Results supported three extracted factors that accounted for approximately 48 % of the total common variance in participants' responses. The first factor (intrinsic motivation, α= .90) accounted for approximately 27 % of the variance in participants' responses. The second factor (extrinsic motivation, α = .85) accounted for approximately 12 % of the variance in responses. The third factor (amotivation, α = .76) accounted for approximately 9 % of the total variance. The internal reliabilities of the intrinsic motivation, extrinsic motivation, and amotivation scales were .95, .88, and .82 for the Indian immigrant sample and .76, .80, and .70 for the Indian sample.

3 Results

3.1 Descriptive statistics

The mean, standard deviation, minimum, maximum, skewness, and kurtosis values for all the variables of interest in the present study were computed for the whole sample (see Table 1), and separately for the Indian immigrant and Indian adolescent groups (see Tables 2 and 3). The univariate distributions of each of the variables of interest were examined. For each variable, histograms, box-plots, and normal-probability plots were observed. The distributions of data for the variables of interest were relatively normal.

Table 1 Descriptive statistics and correlations among the study variables (total sample, $N = 718$)

					Correlation				
	M	SD	Skewness	Kurtosis	1	2	3	4	5
1. Overall school GPA	3.95	.77	−.85	1.36	–				
2. School self-concept	4.92	.53	−.36	−.12	.45**	–			
3. Intrinsic motivation	4.82	1.15	−.39	−.19	.31**	.28**	–		
4. Extrinsic motivation	5.27	1.01	−.77	.70	.08*	.17**	.39**	–	
5. Amotivation	2.31	1.36	.99	.35	−.13**	−.22**	−.04	−.11**	–

Overall school GPA (minimum = 1, maximum = 5); school self-concept (minimum = 1, maximum = 6); intrinsic motivation, extrinsic motivation, amotivation (minimum = 1, maximum = 7)
* $p < .05$; ** $p < .01$

Table 2 Descriptive statistics and correlations among the study variables (Indian immigrant sample, $N = 355$)

					Correlation				
	M	SD	Skewness	Kurtosis	1	2	3	4	5
1. Overall school GPA	4.12	.49	.10	1.51	–				
2. School self-concept	4.99	.50	−.16	−.54	.34**	–			
3. Intrinsic motivation	4.97	1.39	−.56	−.63	.48**	.35**	–		
4. Extrinsic motivation	5.20	1.09	−.79	.67	.01	.18**	.34**	–	
5. Amotivation	2.22	1.35	1.21	.92	−.07	−.17**	.01	−.14**	–

Overall school GPA (minimum = 1, maximum = 5); school self-concept (minimum = 1, maximum = 6); intrinsic motivation, extrinsic motivation, amotivation (minimum = 1, maximum = 7)
** $p < .01$

Table 3 Descriptive statistics and correlations among the study variables (Indian sample, $N = 363$)

					Correlation				
	M	SD	Skewness	Kurtosis	1	2	3	4	5
1. Overall school GPA	3.79	.94	−.58	−.04	–				
3. School self-concept	4.85	.55	−.46	−.02	.50**	–			
3. Intrinsic motivation	4.68	.83	−.47	.03	.23**	.17**	–		
4. Extrinsic motivation	5.35	.91	−.64	.27	.17**	.18**	.56**	–	
5. Amotivation	2.40	1.35	.81	−.01	−.15**	−.24**	−.09	−.10*	–

Overall school GPA (minimum = 1, maximum = 5); school self-concept (minimum = 1, maximum = 6); intrinsic motivation, extrinsic motivation, amotivation (minimum = 1, maximum = 7)
* $p < .05$; ** $p < .01$

3.2 Correlational analyses

Bivariate correlations among all the variables of interest were computed for the whole sample (see Table 1), and separately for the Indian immigrant and Indian adolescent groups (see Tables 2 and 3). For Indian immigrant adolescents, overall school GPA was positively correlated with school self-concept and intrinsic

motivation. Extrinsic motivation and amotivation were not related to overall school GPA for Indian immigrant adolescents. For Indian adolescents, overall school GPA was positively correlated with school self-concept and intrinsic and extrinsic motivation. In contrast, overall school GPA was negatively correlated with amotivation. School self-concept was positively correlated with intrinsic and extrinsic motivation for both Indian immigrant and Indian adolescents, whereas school self-concept was negatively correlated with amotivation for both Indian immigrant and Indian adolescents.

3.3 Mediating effect of academic motivation on the relationship between school self-concept and school achievement

Because the causal steps strategy for testing mediational hypotheses (Baron and Kenny 1986) and the Sobel test (Sobel 1982) for the statistical significance of mediation have been found to be problematic in several respects (see MacKinnon et al. 2004; Preacher and Hayes 2008; Shrout and Bolger 2002; Zhao et al. 2010), bootstrapped tests of simultaneous multiple indirect effects (see Preacher and Hayes 2008) were conducted to determine the unique ability of each putative mediator to account for the effect of school self-concept on overall school GPA for Indian immigrant adolescents in Canada and Indian adolescents in India (see Table 4). Bootstrapping, a nonparametric resampling procedure (Preacher and Hayes 2004, 2008), empirically generates an approximation of the sampling distribution (Hayes 2009). In multiple mediation models, sampling distributions of total and indirect effects are empirically generated by selecting a subsample, with replacement, of the full data set and then calculating indirect effects in the repeated subsamples (see Preacher and Hayes 2004, 2008).

Table 4 Mediation of the effect of school self-concept on school achievement through intrinsic motivation, extrinsic motivation, and amotivation for Indian immigrant and Indian adolescents

	Indian immigrant adolescents			Indian adolescents		
	BC 95 % CI			BC 95 % CI		
	Point estimate (*SE*)	Lower limit	Upper limit	Point estimate (*SE*)	Lower limit	Upper limit
Mediators						
IM	.16 (.02)*	.11	.23	.04 (.02)*	.01	.10
EM	−.04 (.01)*	−.07	−.01	.00 (.01)	−.03	.04
AMOT	.01 (.01)	−.01	.03	.01 (.02)	−.03	.06
Total effect	.14 (.02)*	.08	.20	.05 (.03)*	.01	.12
Contrasts						
IM—EM	−.20 (.03)*	−.28	−.13	−.04 (.03)	−.11	.01
IM—AMOT	−.15 (.03)*	−.22	−.09	−.03 (.03)	−.10	.03
EM—AMOT	.05 (.02)*	.01	.09	−.01 (.02)	−.04	.06

BC bias-corrected, *CI* confidence interval, *SE* standard error, *IM* intrinsic motivation, *EM* extrinsic motivation, *AMOT* amotivation. Confidence intervals containing zero are interpreted as being not significant at the .05 level

* $p < .05$

Thus, the bootstrapping procedure yields point estimates (PE) and bias-corrected (BC) confidence intervals for indirect (mediated) and total effects.

Simulation research has shown that bootstrapping is superior to the product of coefficients approach or the Sobel test and the most commonly used Baron and Kenny (1986) causal steps approach in terms of statistical power while maintaining reasonable control over a Type I error (e.g., MacKinnon et al. 2004; Williams and MacKinnon 2008). Point estimates (i.e., mediated or indirect effects) and bias-corrected (BC) bootstrap confidence intervals (CIs) based on 5,000 bootstrap samples (see Preacher and Hayes 2008) were estimated for the Indian immigrant and Indian samples. Bias-corrected bootstrap confidence intervals perform best in testing for mediation effects (Cheung and Lau 2008). A point estimate for an indirect or mediated effect (total or specific) was considered statistically significant if zero was not included in the 95 % bias-corrected confidence intervals (see Preacher and Hayes 2008; Zhao et al. 2010). The mediators were intrinsic motivation, extrinsic motivation, and amotivation. The independent variable was school self-concept, and the dependent variable was overall school GPA. Gender was entered as a control variable.

3.3.1 Indian immigrant adolescents

The specific indirect effect of school self-concept on overall school GPA through intrinsic motivation was statistically different from zero (PE = .16, BC 95 % CI of .11–.23), indicating that intrinsic motivation is a statistically significant mediator of the relationship between school self-concept and school achievement for Indian immigrant adolescents in Canada. In addition, the specific indirect effect of school self-concept on overall school GPA through extrinsic motivation was also statistically different from zero (PE = −.04, BC 95 % CI of − .07 to − .01), suggesting that extrinsic motivation is a statistically significant mediator of the relationship between school self-concept and school achievement for Indian immigrant adolescents. However, the specific indirect effect of school self-concept on overall school GPA through amotivation was not statistically different from zero (PE = .01, BC 95 % CI of − .01 to .03).

The sum of the specific indirect effects (i.e., total indirect effects) was statistically significant for the relationship between school self-concept and overall school GPA (PE = .14, BC 95 % CI of .08–.20). Examination of the pairwise contrasts (i.e., tests of the difference between specific indirect effects; see Preacher and Hayes 2008) of the indirect effects revealed that the specific indirect effect of school self-concept on overall school GPA through intrinsic motivation was larger than the specific indirect effect through extrinsic motivation (PE = −.20, BC 95 %CI of − .28 to − .13), and through amotivation (PE = −.15, BC 95 % CI of − .22 to − .09). Furthermore, the specific indirect effect of school self-concept on overall school GPA through extrinsic motivation was larger than the specific indirect effect through amotivation (PE = .05, BC 95 % CI of .01–.09).

3.3.2 Indian adolescents

The specific indirect effect of school self-concept on overall school GPA through intrinsic motivation was statistically different from zero (PE = .04, BC 95 % CI of

.01–.10), indicating that intrinsic motivation is a statistically significant mediator of the relationship between school self-concept and school achievement for Indian adolescents in India. However, the specific indirect effect of school self-concept on overall school GPA through extrinsic motivation (PE = .00, BC 95 % CI of − .03 to .04) and amotivation (PE = .01, BC 95 % CI of − .03 to .06) was not statistically different from zero, indicating that extrinsic motivation and amotivation are not statistically significant mediators of the relationship between school self-concept and school achievement for Indian adolescents. The total indirect effect was statistically significant for the relationship between school self-concept and overall school GPA (PE = .05, BC 95 % CI of .01–.12). No statistically significant differences were found while contrasting specific indirect effects within the mediation model (see Table 4).

Finally, *t* tests were conducted to examine whether or not the point estimates from the two subsamples—Indian immigrant and Indian—for intrinsic motivation, extrinsic motivation, and total effects were statistically significantly different from one another. However, there were no statistically significant differences between Indian immigrant adolescents and Indian adolescents in terms of their point estimates for intrinsic motivation ($t = 1.68$, $p = .34$), extrinsic motivation ($t = -1.00$, $p = .50$), and total effects ($t = 2.11$, $p = .28$).

4 Discussion

The purpose of the study was to examine the mediating effect of academic motivation on the relations between school self-concept and school achievement among Indian immigrant adolescents in Canada and Indian adolescents in India. While both intrinsic and extrinsic motivation mediated the relationship between school self-concept and school achievement for the Indian immigrant adolescents in Canada, only intrinsic motivation mediated the relationship between school self-concept and school achievement for the Indian adolescents in India. The mediational role of intrinsic motivation in the association between school self-concept and school achievement is in congruence with the findings of prior research (see Guay et al. 2010). This finding suggests that the Indian immigrant and Indian adolescents who perceive themselves as academically competent may obtain higher grades in school because their school self-concepts help them to be more intrinsically motivated toward school and academics.

This reveals the critical role that intrinsic motivation—an autonomous form of motivation—may play in improving the academic achievement of Indian immigrant adolescents in Canada and Indian adolescents in India. Hence, this finding is also consistent with SDT's proposition. According to SDT, individuals with high perceived competence or positive academic self-concepts are more likely to have high autonomous or intrinsic motivation toward their activity because they are acting with an internal perceived locus of causality (Deci and Ryan 2002).

However, extrinsic motivation as well mediated the relationship between school self-concept and school achievement for Indian immigrant adolescents in Canada. The Indian immigrant adolescents in Canada who had higher positive academic self-concepts also tended to be extrinsically motivated, and reported higher overall school GPAs. This finding suggests the crucial role that extrinsic motivation plays in the

association between academic self-concepts and academic achievement among Indian immigrant adolescents in Canada. Furthermore, in line with SDT, it suggests that autonomous or intrinsic motivation and controlled or extrinsic motivation may not be necessarily opposite dimensions, and individuals can potentially report both motivations for a given academic domain (Ryan and Connell 1989). Lepper et al. (2005) postulate that intrinsic and extrinsic motivation may be largely orthogonal dimensions of motivation in school, and developing both intrinsic and extrinsic motives can be adaptive for students.

Although the Indian immigrant adolescents in Canada and the Indian adolescents in India are culturally homogeneous groups, extrinsic motivation, however, did not mediate the relations between academic self-concept and academic achievement for the Indian adolescents in India. The Indian adolescents in India who had higher perceived academic competence and GPAs tended not to be extrinsically motivated. This finding indicates that these adolescents may not be acting with an external perceived locus of causality, and their high perceived academic competence might be promoting their autonomous or intrinsic motivation toward school and academics.

Even though extrinsic motivation did not mediate the relations between school self-concept and school achievement for the Indian adolescents in India, the point estimates for extrinsic motivation were not significantly different for the Indian immigrant and Indian groups, suggesting that the differences between Indian immigrant and Indian groups in terms of the mediating effect of extrinsic motivation on the relationship between school self-concept and school achievement are trivial. Likewise, the point estimates for intrinsic motivation were not significantly different for the Indian immigrant and Indian groups, indicating that the differences between Indian immigrant and Indian groups in terms of the mediating effect of intrinsic motivation on the relationship between school self-concept and school achievement are not substantial.

Finally, the mediational analyses revealed that amotivation did not mediate the association between academic self-concepts and academic achievement among Indian immigrant and Indian adolescents. These adolescents' positive academic self-concepts might be acting as a protective factor, thereby providing a potentially important buffer against the detrimental effects of academic amotivation. For example, Eckert et al. (2006) have documented that students' positive academic self-concepts are particularly important in buffering the potentially negative influences of failure on subsequent performance.

4.1 Limitations of the study

There are three limitations to the current study. First, the study used self-report measures to assess Indian immigrant and Indian adolescents' academic achievement, academic self-concept, and academic motivation. Although self-report measures are not inherently inferior to behavioural and biological measures (see Haeffel and Howard 2010), the critics of self-report research have always challenged the very validity and reliability of self-report measures (see Fulmer and Frijters 2009, for a review).

Reactivity—changes in responding that occur when research participants know they are being measured—is one of the major limitations of self-report measures

(Stangor 2011). The use of self-report measures of academic self-concept and academic motivation may result in self-promotion, the most common type of reactivity. Self-promotion may occur when research participants respond in ways that they think would make them look good, that is, the research participants might resort to overestimating their positive traits and underestimating their negative traits (Stangor 2011). Furthermore, although self-reported grades may reflect the actual grades of students with high ability and good GPAs, they may not represent accurately the actual scores of students with low ability and low GPAs (Kuncel et al. 2005).

To offset the flaws in self-report research, therefore, future research examining the relationships among academic achievement, academic self-concept, and academic motivation may benefit from the use of a wider range of methodologies for measuring academic achievement, academic self-concept, and academic motivation in addition to the self-report methodology (Fulmer and Frijters 2009). Such additional methodologies may include, among others, behavioural, phenomenological/authentic, and neuropsychological/physiological approaches (see Fulmer and Frijters 2009).

Second, data for the present study were drawn from the Indian immigrant and Indian adolescents belonging to Kerala, one of the states in India. Because India is a culturally diverse country, the relationships among academic achievement, academic self-concept, and academic motivation for the Indian immigrant and Indian adolescents in the study may not be generalizable to adolescents across cultures in India. Given the dearth of research on Indian adolescents' school engagement and achievement, future research involving participants hailing from diverse cultures in India may help to formulate appropriate educational policies and interventions to enhance Indian adolescents' motivation, engagement, and achievement.

Finally, the current study did not measure Indian immigrant and Indian adolescents' prior academic achievement. Hence, the study did not partial out the effect of prior academic achievement while testing the mediating effect of academic motivation on the relationship between school self-concept and school achievement. Prior studies, however, have demonstrated that prior academic achievement might affect subsequent academic self-concept (Marsh et al. 2002) and subsequent academic motivation (Guay et al. 2010). Therefore, the results of this study need to be considered cautiously.

In conclusion, despite these limitations, the findings of the study suggest that the Indian immigrant adolescents in Canada may not differ much from their counterparts in India in terms of the mediating effect of academic motivation on the relationship between school self-concept and school achievement. Hermans and Kempen (1998) posit that travel and relocation from one culture to another culture may result in an interweaving of cultures—cultural practices of the home culture may blend with those of the host culture to form a 'hybridized culture.' However, the present study suggests that the Indian immigrant adolescents, despite having emigrated from a moderately collectivist culture—India—to a highly individualistic culture—Canada, may not have changed their ethnic identity, attitudes, values, and behaviours with respect to their education. A longitudinal research design involving the same research participants before and after immigration to Canada may help us better understand the changes in Indian adolescents' academic achievement, academic self-concept, and academic motivation before and after immigration to Canada. Therefore, future research investigating the impact of social psychological constructs, such as academic self-concept and

academic motivation, on school achievement of children emigrating from countries across the world might benefit from the adoption of a longitudinal research design.

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