Trajectories of Chinese students' sense of school belonging and academic achievement over the high school transition period

Yangyang Liu *, Zuhong Lu

Southeast University, PR China

ABSTRACT

The present study identified the different patterns of Chinese students' academic achievement trajectories over the high school transition period and examined the relationships between students' sense of school belonging trajectories and the different patterns of academic achievement trajectories. In a sample of 567 Chinese high school students, a growth mixture model identified three different patterns of academic achievement trajectories. These were classified as the increasing class, decreasing class and normative class. The structural equation model then indicated that neither the initial status nor the rate of change of students' sense of school belonging significantly predicted the changes in their academic achievement over the high school transition period. The findings challenged the links between sense of school belonging and academic achievement.

© 2011 Elsevier Inc. All rights reserved.

In existing literature, sense of belonging has been suggested to be a basic psychological need of human beings (Anderman, 2003). The satisfaction of this need has often led to positive psychological outcomes (Anderman, 2003). Given the importance of sense of belonging, over the past 2 decades, educational researchers have become more interested in investigating the effects of students' sense of school belonging on educational processes and outcomes (E. M. Anderman, 2002). The sense of school belonging has been defined as a sense of being accepted, valued, included, and encouraged by teachers and peers in school settings (Goodenow, 1993b). In previous research, a growing body of evidence has shown that students' sense of school belonging was positively associated with their academic achievement (E.M. Anderman, 2002; Goodenow, 1993a; Roeser, Midgley & Urdan, 1996). Furthermore, some researchers suggested that students' sense of school belonging may influence their successful transition into new high school settings (Newman, Lohman, Newman, Myers & Smith, 2000) where the organizational/structural and social aspects of the schools (e.g., school practice, procedure, and policy) were usually altered (Eccles & Midgley, 1988; Reyes, Gillock, Kobus & Sanchez, 2000). However, to our knowledge, no study has directly addressed the trajectories of students' sense of school belonging over the high school transition period. Moreover, as students' academic achievement was usually treated as a static outcome, little is known about whether the trajectories are related to students' academic growth. In the present

study, we seek to contribute to the literature by reducing this gap in current research.

Furthermore, recently, researchers have proposed that the changes in students' academic achievement appeared to show patterns over time (Johnson, McGue & Iacono, 2006). For example, some students fall further and further behind their classmates throughout the school years, whereas other students achieve higher and higher scores over the same period (Johnson, McGue & Iacono, 2006). However, to our knowledge, no existing study has investigated the distinct patterns of students' academic achievement trajectories over the high school transition period. Studies examining the relationships among trajectories of sense of school belonging and different patterns of academic achievement trajectories are also lacking. In the present study, we aim to investigate how the development of sense of school belonging influences different patterns of students' academic achievement trajectories over the high school transition period. Examining these relationships will be helpful in answering whether the effects of sense of school belonging on academic achievement across different patterns of academic achievement trajectories over the high school transition period are similar or not.

In addition, the previous work on sense of school belonging has been conducted almost exclusively in the United States. Although Chinese people represent nearly 20% of the world's population (Lu, Siu & Lu, 2010), little is known about the effects of Chinese students' sense of school belonging on their academic achievement. In the present study, we also want to contribute to the literature by examining the relationships between Chinese students' sense of school belonging over the high school transition period and their academic achievement.

* Corresponding author.
E-mail address: liuyangyang661@sina.com (Y. Liu).

1. The present study

In the present study, the primary purposes are to (a) identify distinct developmental trajectories of students' academic achievement over the high school transition period; and (b) examine the relationships between trajectories of students' sense of school belonging and their academic achievement. Before our study, we interviewed several Chinese high school teachers. They all suggested that the students' academic achievement growth in the three high school years depended largely on the development of their academic achievement in the first high school term. Hence, in the present study, we focus on students' academic achievement trajectories in the first term of grade 10, and examine how the development of Chinese students' sense of school belonging influences their academic achievement over the first high school term. In previous research, some studies indicated that as a stressful experience for students, the school transition was often associated with deteriorated academic achievement for both boys and girls (Gillock & Reyes, 1996; Reyes, et al., 2000). On the other hand, theories of resiliency have suggested that many students may adjust well within a context of significant hardship (Gomez & McLaren, 2006). Hence, in the present study, we first hypothesize that several distinct patterns of academic achievement trajectories will emerge over high school transition period. On the other hand, because the present study constitutes a first investigation of trajectories of sense of school belonging with different patterns of academic achievement trajectories over the high school transition period, we feel that it may be too speculative to propose specific hypotheses. Therefore, we do not propose specific hypotheses on the relationships among trajectories of sense of school belonging and different patterns of academic achievement trajectories.

2. Method

2.1. Participants

Participants were recruited from two urban public senior high schools (12 classes) located in Jiangsu Province, People's Republic of China. The two schools were randomly chosen and one was of above-average achievement level, whereas the other one was of below-average. Letters were sent to 600 tenth-grade high school students immediately when they transitioned into the high schools. From this point, 567 students (306 females) (94.5%) agreed to participate in our study. The mean age was 16.38 years (SD = .63) for males and 16.36 years (SD = .52) for females. The students were primarily from working- and middle-class families.

2.2. Procedure

Beginning in the 15 days after the students entered the high schools (Time 1), they completed a 20 min survey during classroom time. Then near the middle examination (Time 2) and final examination (Time 3) of the first high school term, the students were invited to participate in our next two-wave investigations. In total, there were three waves of data collection in the present study. The administration of the measures was carried out by graduate students in psychology. As a result of some students losing interest in participation, in the present study, 83% provided data for all three waves, and 90% provided data for at least two waves. Furthermore, we collected the students' middle and final examination scores of the first high school term. In addition, in order to look at the students' situations before high school, we also collected the students' high school entrance examination scores which represented the students' academic achievement in their middle school years.

2.3. Measures

2.3.1. Sense of school belonging

Sense of school belonging was assessed with a nine-item measure adapted from Goodenow's (1993b) scale on sense of school belonging (e.g., I feel like I am part of this school). The students were asked to respond on a four-point scale ranging from 1 (Strongly disagree) to 4 (Strongly agree). The negative keyed items were reverse coded and average scale scores were computed. The confirmatory factor analysis indicated this scale had a good validity, $\chi^2 = 89.09$, df = 27, $\chi^2/df = 3.30$, comparative fit index (CFI) = .94, Tucker–Lewis Index (TLI) = .90, root mean square error of approximation (RMSEA) = .07. The internal consistency of this scale was good in the present study ($\alpha = .82$).

2.3.2. Academic achievement

In China, high school students' academic achievement is mainly evaluated by a sum score of Chinese, Mathematics and English. Hence, the standardized scores of Chinese, Mathematics, and English were used in the present study. The scores of these courses were based on objective examinations conducted by the two schools. The maximum score for each course was 100, and a score below 60 meant a failure. This method has been widely used to measure Chinese students' academic achievement (Liu & Lu, 2011).

2.3.3. Analytic strategy

In the present study, for testing the developmental time-dependent link between students' sense of school belonging and their academic achievement, growth mixture model was firstly used for trajectory analyses to identify heterogeneity in the patterns of students' academic achievement over the high school transition time. We investigated models from one to four latent classes in order to determine the optimal number of classes. We examined fit indices, class proportions, classification efficiency, and the interpretability of each class. Bayesian information criterion (BIC) and Akaike information criterion (AIC) were used to determine the optimal model. Smaller BIC and AIC values indicate better fitting models (Muthén & Muthén, 2004). In addition, we also used the Lo–Mendell–Rubin likelihood ratio test of model fit which compares the estimated model with a model with $k-1$ class (Lo, Mendell & Rubin, 2001). The Lo–Mendell–Rubin test yields a p value that equals the probability that a model with one less class generated the data; that is, a low p value indicates that the estimated model fits the data better than one with one less class (Muthén & Muthén, 2004). Then, the structural equation modeling was used to examine the effects of both the initial status and the changes of students' sense of school belonging on their academic achievement trajectories over the same period. In the present study, missing values for the explanatory variables were imputed by the EM algorithm (Dempster, Laird & Rubin, 1977).

3. Results

3.1. Descriptive results

Descriptive data including means and standard deviations of the variables are presented in Table 1. Inter-correlations among the variables are listed in Table 2.

Table 1
Descriptive data.

Variable	M	SD
Sense of school belonging (Time 1)	3.13	.54
Sense of school belonging (Time 2)	3.17	.52
Sense of school belonging (Time 3)	3.08	.54

Note. N = 567.