

Educational Tracking and Juvenile Deviance in Taiwan: Direct Effect, Indirect Effect, or Both

International Journal of
Offender Therapy and
Comparative Criminology
2016, Vol. 60(3) 326–348
© The Author(s) 2014
Reprints and permissions:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/0306624X14549440
ijo.sagepub.com



Wen-Hsu Lin¹ and Chin-Chun Yi²

Abstract

Educational tracking in Chinese society is quite different from that in Western society, in that the allocation to either the vocational or academic track is based on a national entrance examination, which happens at ninth grade (age 14-15). Hence, students in many Asian countries (e.g., China and Taiwan) have to face academic tracking in early adolescence. Because of cultural emphasis on education in Taiwan, the impact of tracking on deviance is profound and can be seen as a crucial life-event. With this concept in mind, we examine how educational tracking influences adolescent deviance during high school. In addition, we also examine how educational tracking may indirectly influence deviance through other life domains, including depression, delinquent peer association, and school attachment. By using longitudinal data (the Taiwan Youth Project), we find that educational tracking increases deviance not only directly but also indirectly through delinquent peers and low school attachment. Some implications and limitations are also discussed.

Keywords

educational tracking, juvenile deviance, direct effect, indirect effect

Introduction

Adolescence is a period full of changes and turmoil, often including a surge of deviance. Although involvement in some deviance is “normal” for many youths during this

¹Wenzao Ursuline University of Langu, Kaohsiung, Taiwan

²Institute of Sociology, Academia Sinica, Taipei, Taiwan

Corresponding Author:

Wen-Hsu Lin, Office of Research and Development, Wenzao Ursuline University of Langu, 900 Mintsu 1st Road, Kaohsiung 807, Taiwan.

Email: mars760512@gmail.com

time period (Moffitt, 1993), this does not negate the importance of understanding the etiology of juvenile delinquency. Some causes of delinquency during this time period deserve extra attention because of their importance during this life stage. School and education, for instance, occupy a large share of adolescents' time around the world (Yi, Wu, Chang, & Chang, 2009) and are the most important socialization channels for youths in modern society (Gottfredson & Hirschi, 1990). Life course theorists argue that early involvement in deviance may be a risk factor for later negative life outcomes, such as adult criminal involvement (Piquero & Moffitt, 2005; Sampson & Laub, 2005); in addition, there is a strong connectedness between important life transitions across life stages (e.g., educational experience in adolescence is related to adulthood job attainment; Elder, 1998). Hence, understanding the influence of education on adolescent deviance is important.

Although there may be various strategies to socialize and educate students, one strategy, educational tracking,¹ is controversial. On one hand, tracking may enhance learning and allow tailoring of subjects to suit students' ability (Gamoran & Mare, 1989; Van Houtte, 2004). In addition, tracking makes teaching easy for instructors because students in one class are alike, in terms of their general learning ability level (Lou, Abrami, & Spence, 2000); hence, it increases societal efficiency by properly distributing resources (Ansalone, 2004). On the other hand, some scholars argue that educational tracking does more harm to students than good. Evidence from empirical studies points out that educational tracking maintains the inequality of social status (Gamoran, 1992; Vanfossen, Jones, & Spade, 1987); that is, students from high socioeconomic status (SES) families are more likely to be placed in a high track (e.g., geared toward college) than students from low SES families. Furthermore, prior studies have indicated that educational tracking plays a role in influencing other life domains of a student. For example, students in low tracks showed higher levels of delinquency than their counterparts in high tracks, and this difference is independent of social class or SES (Hargreaves, 1967; Schafer & Olexa, 1971).

Although some studies have examined the relationship between educational tracking and deviance in general, two reasons lead us to further investigate this connection. First, the tracking–deviance connection is mixed. One reason for the mixed results is that many previous studies have been cross-sectional in nature (Akiba, LeTendre, Baker, & Goesling, 2002; Kelly, 1978; Tygart, 1988), which provides limited room for causal inference. In addition, self-selection may plague the tracking–deviance relationship, in that deviant students study less, which places them in lower tracks than non-delinquents. Second, many previous studies derive their empirical results based on Western samples (e.g., U.S. or European samples), but whether similar results can be generalized to the East is unclear. For example, the general cultural preference for the academic track (high school) makes tracking influential in the East.

To address these two limitations, we employed longitudinal data from Taiwan to examine the influence of educational tracking on adolescents' lives, and at the same time, we also provide some control on self-selection effects (e.g., propensity score). Furthermore, we go beyond previous studies by modeling some important mediating mechanisms that link educational tracking to deviance in Taiwan.

Educational Tracking and Deviance

From a life course perspective, tracking placement can be regarded as an important life-event or turning point (Piquero & Moffitt, 2005; Sampson & Laub, 2005) that is capable of changing one's life trajectory in three ways. First, educational tracking can influence students' deviance, either directly (Akiba et al., 2002; Kelly, 1978; Piko, 2000; Tygart, 1988) or indirectly (Febbo-Hunt, 2003; Van Houtte & Stevens, 2008). Based on theory, involvement in deviance in adolescence is related to future life outcomes (e.g., criminal involvement and economic problems) in adulthood (Farrington, 2005; Odgers et al., 2008). Second, previous studies have found that different educational tracks produce very different life outcomes, such as low academic and economic attainment or low self-esteem (Chang, Hsueh, & Hwang, 1996; Friedkin & Thomas, 1997; Van Houtte, 2005). Specifically, Chang and colleagues (1996) found that tracking determined adolescents' academic choices and paths, which lead to different educational attainment, which in turn influences one's job in early adulthood. Third, Yogan (2000) and others (Lucas & Good, 2001) found that students rarely migrate from one track to another; hence, students are "forced" to stay in a track until they complete a particular period of education. Consequently, educational tracking can limit students' future directions and produces different life outcomes, and, to some extent, can be considered a turning point because of its profound and long-term effects on a person's life.

The above theoretical perspective identifies tracking as a potentially important life-event that can influence adolescents' current and future lives, including deviance. A direct relationship between educational tracking and deviance can be expected. First, for instance, according to status maintenance theory, tracking is a mechanism that maintains social status of origin (Oakes, 1985; Vanfossen et al., 1987). In combination with classic strain theory, it would not be hard to understand the direct link between tracking and deviance. Specifically, school can be seen as a community, and tracking is the social structure (Febbo-Hunt, 2003) which limits students' opportunities to pursue educational advancement or rewards in school. As such, the observation of Cloward and Ohlin (1960) and Cohen (1955) may be reproduced: the tracking (strain) leads to deviance. Second, location in the reward system of school influences students' deviance because a low track may receive fewer resources (Lyau & Liu, 2004), or teachers may possess less qualifications and have a negative attitude toward students (Yogan, 2000), both of which create a negative experience (Agnew, 2006).²

Previous studies provided some clues on the linkage between educational tracking and adolescent deviance. Studies have shown educational tracking to be related to deviance at the individual level and school level (Akiba et al., 2002; Piko, 2000; Tygart, 1988); that is, deviance is more prevalent among students in a vocational track than among those in higher tracks (e.g., the academic track). Specifically, school vandalism (Tygart, 1988) and violence (Akiba et al., 2002) are more prevalent in schools that employed a tracking system, and students from a vocational track are more likely to engage in substance abuse (Piko, 2000) and be involved in general delinquency (Kelly, 1978) than students in an academic track. Although each of these results shows

that educational tracking is related to various deviant acts, none of these studies lay out a specific effect argument. Similarly, Van Houtte and Stevens (2008) also commented on this point, stating that “[T]he theories appearing in these works usually do not distinguish between general delinquency and more specific school misconduct” (p. 247). Consequently, the expectation might be a general one; that is, tracking may be criminogenic.

Notwithstanding the supportive results, one study revealed no relationship between track placement and students’ general delinquency (Wiatrowski, Hansell, Massey, & Wilson, 1982). This particular study goes beyond previous studies by using longitudinal data and including a control for pre-track delinquency, and indicates that track did not significantly predict later delinquency. Taken together, the inconsistent results between studies deserve further attention. In addition, one significant limitation of previous studies is the self-selection bias; that is, students who are in a low track are naturally more deviant. This argument is not without empirical grounds, as studies have consistently shown that delinquents have lower academic performance (Fergusson & Horwood, 1995; Mak, Heaven, & Rummery, 2003) than their counterparts. Hence, revisiting the tracking–deviance link with control for self-selection is important.

Besides the direct effects of educational tracking on deviance, the relationship between educational tracking and deviance may be indirect, through affecting other social and individual domains (e.g., parental relationships or depression). One of the indirect effects is through its influence on individuals’ negative emotions (e.g., depression). As mentioned, classic and general strain theories (GST) argue that being placed in the vocational track is a strain because students are prevented from pursuing a valued goal (e.g., academic tracking and educational advancement), and students in a lower/vocational track receive relatively few educational resources. Furthermore, adolescent students have neither the power to change the system nor legitimate ways to escape it. These experiences generate negative emotions in the recipients that in turn make the individual want to respond so as to correct the bad feeling and/or stressful situation. Although Cohen (1955) and Agnew (2006) expected anger or frustration as the focus of strain theories, depression is another important negative emotion during adolescence. The tracking–depression linkage might be understood through three ways. First, Agnew (2006) found evidence for a depressive response to strain that is seen as “beyond the control of the individuals” (p. 34). As mentioned, track placement in many cases is based not on students’ interest but on other standards (e.g., performance), and most importantly, track migration rarely happens (Lucas & Good, 2001). Hence, it might be beyond students’ reach to change the situation, which may be related to depressive feelings. Second, studies have shown that depression is a complex phenomenon involving negative emotion that is often mingled with other negative feelings, such as anger (Busch, 2009; Koh, Kim, & Park, 2002). Third, relevant to the present study context, students in Taiwan go to different tracking schools based on their entrance exam scores. Hence, all students in the same schools have the same tracking curricula. As such, the frustration and anger that emerge from comparing oneself with others (Yogan, 2000) might not be as acute as strain theory would expect. Furthermore, in Chinese culture, with its emphasis on social harmony and

collectivistic culture, expression of negative emotions, especially anger, is prohibited or suppressed (Kleinman, 1986). A connection between depression and adolescent deviance has also been found by previous studies (Beyers & Loeber, 2003; Petersen, Compas, & Brooks-Gunn, 1992). Taken as a whole, tracking might be related to deviance through depression.

In addition to the indirect influence of educational tracking on deviance through the individual domain (e.g., depression), educational tracking may also affect deviance through its impacts on students' peer association. To a juvenile, school is an important social context that occupies a large share of time during adolescence. Educational tracking places students of similar backgrounds, abilities, and learning interests together in a specific learning environment and group (Reinke & Walker, 2006). Hence, tracking provides a differential social organization for students to build friendships, and this process is even stronger than it is in other social contexts because of the amount of time spent in school, and the similar backgrounds and life experiences of students in the same tracks (Crosnoe, 2002; Kubitschek & Hallinan, 1998). Although the "culture" of a vocational track may not be antisocial, some studies note that the potential exists for such a pattern (Crosnoe, 2002; Eccles & Roeser, 2009; Yogan, 2000). First, the concurrence of behavior problems and school difficulties (e.g., staying in a low track) is high; hence, tracking may inevitably aggregate students with behavioral problems together. Students, then, may become more similar to other delinquent students and deviance may be perpetuated (Crosnoe, 2002; Reinke & Walker, 2006). Second, Eccles and Roeser (2009) argued that curricular tracking collects students who are alienated from school because of doing poorly in school, which makes risky or delinquent behavior more likely (Dryfoos, 1990). Third, Cohen's (1955) observation revealed that students who failed to reach the standard in the school were precipitated into the same classroom and created their own "standard," which was delinquent in nature. Having delinquent peers is one of the most robust risk factors for deviance (Akers, 1998; Warr, 2002). Consequently, educational tracking could affect adolescent deviance through influencing their delinquent peer association.

Finally, social control theory argued that one is less likely to commit deviance if he or she has great "stake in conformity" (Hirschi, 1969; Toby, 1957). In the present case, students in a vocational track may not build emotional attachment to school because of a pre-set mentality of being forced to accept a "second" choice. This lack of emotional attachment to school can be understood because teachers in a vocational track may have less concern for their well-being, and schools may devote fewer resources to this track, as argued before; hence, students may hold negative perceptions of their schools. These then are likely to lead to low school attachment. In contrast, students in an academic track set goals to go to college. They involve themselves in their schoolwork; hence, they "buy into" school norms. Consequently, they build emotional attachment to school. As Hirschi (1969) would argue, lack of emotional connection to a conventional institute frees an individual to engage in deviance because they have less to lose and they have not internalized the school norms. Therefore, we expect that students in a vocational track may have higher levels of deviance because of low school attachment.

Tracking in Taiwan: Chinese Cultural Heritage

The educational system in Taiwan comprises 6 years of elementary school, 3 years of junior high school, 3 years of high school, and 4 years of university. After 9 years of compulsory education (elementary and junior high school), students take two nationwide entrance examinations. Based on the results of these exams, school tracking differentiates students into two paths, an academic track (3 years in senior high school) and a vocational track (3 years in vocational high school or 5 years in junior college). The former offers a curriculum that prepares students for college, whereas the latter offers courses that equip students for future occupations in areas such as agriculture, business, and nursing. These two tracks differ not only in the curriculum offered but also in the average cognitive ability of the enrolled students (Huang, Yi, & Yang, 2008). Although the non-random track placement may be well-intended, Chinese culture, particularly in Taiwan, values the academic track more than the vocational track because of the Confucian ethos that emphasizes educational attainment.

Chinese culture has been rooted in the Confucian ideology for over two millennia. The importance of Confucian ideology for understanding Chinese culture in general and Taiwanese culture in particular has been noted (Lam, 2007; Zheng, 2003). Bond and Hwang (1986) stated that the teachings of Confucius are central to individuals' ideologies and behavior. It is widely recognized that Chinese parents attach great value and importance to education and academic achievement (Ho, 1986; Shek & Lee, 2007). As such, parents are willing to invest significantly in their children's education and help them attain the highest education level possible (Ho, Chen, & Kung, 2008; Yi & Wu, 2004). This value is instilled in children, and they are given a clear goal: "Study hard, get ahead in the entrance examinations and bring glory to the family . . ." (Yi et al., 2009, p. 398).

In addition to the cultural heritage that emphasizes academic success, parents' expectation may also put greater value on the academic track (college preparation track). In the past, education was scarce; hence, higher education was for elites who could afford it and were prepared for it. These "blessed" individuals enjoyed higher pay when entering the job market in Taiwan. Consequently, these individuals, who are now parents, are eager to reproduce the same results in their offspring (e.g., maintaining social class/status), which echoes the empirical studies from both the West (Gamoran, 1992) and Taiwan (Hsueh, 1996; Tsai, 2004). Parents who did not enjoy such a privilege admonish their children to study hard and get into college so that they can have a better life or fulfill their parents' dream of a higher education. Furthermore, holding a high school diploma from a vocational school narrows one's career prospects and limits expected income in the future. Hence, the majority of Taiwanese value the academic track, which prepares students for university, more than the vocational track. For example, Lin (2004) found that students from both tracks regard education as very important, and students from the academic track have higher self-esteem than those in the vocational track. As Yi, Fan, and Chang (2012, p.159) stated, "The educational tracking outcome undoubtedly presents different life chances for adolescents." Taken together, students in Taiwan who get into an academic track have a brighter future than those who get into a vocational track.

The review presented in the previous sections mentions that the theoretical framework of the relationship between tracking and delinquency is often based on Western studies; hence, whether the same can be found in the East and in Taiwan is an open question. Most previous studies in Taiwan have focused on how family and/or social background affects tracking placement (Hsueh, 1996; Tsai, 2004) and how tracking affects future educational and occupational attainment (Chang et al., 1996; Lin, 2002) or students' well-being (Yi et al., 2012). The results of this body of literature are similar to those found in the West; that is, higher social status (i.e., SES) increases the likelihood of placement in an academic track, and students in such tracks are more likely to have a better future (e.g., a better job) and greater well-being (e.g., low levels of depression). However, no study that we are aware of investigates the possible tracking–deviance link.

With regard to the possible mechanisms through which educational tracking affects deviance, no studies that we are aware of directly examine these three links. We provide some review on the related literature. First, like the results in Western countries, studies in Taiwan reveal that students (elementary to junior high) are more likely to commit acts of delinquency when they have delinquent friends (Chen & Tung, 2006; Lee, 2011), low school attachment (Lee, 2011; Tan, 2011), and high depression (Chueh, 2001; C.-I. Wu & Lei, 2003) than are those who do not possess these risk factors. One study showed no significant effects of tracking on students' moral beliefs (Wu & Jou, 2009). Based on these studies, one can see the links between depression, delinquent peers, school attachment, and juvenile delinquency. However, the relationship between tracking and each of these possible mediating mechanisms and deviance is not that clear.

The Present Study

In view of the particular educational system in Taiwan and the lack of research on the tracking–deviance issue in Eastern cultures, in combination with the mixed results on the educational tracking–deviance relationship (Akiba et al., 2002; Hargreaves, 1967; Kelly, 1978; Piko, 2000; Schafer & Olexa, 1971; Tygart, 1988; Wiatrowski et al., 1982), our first task is to examine the direct effect of educational tracking on adolescent deviance in Taiwan; that is, we hypothesize that students in a vocational track will have higher levels of deviance than others who are in an academic track (see H1 paths in Figure 1).

The above review also reveals that educational tracking might have indirect effects on deviance through depression, low school attachment, and delinquent peer associations. Many previous studies have not considered these three mechanisms simultaneously, nor do they consider potential cultural differences (Cheung & Rudowicz, 2003). Hence, our second task is to investigate these theoretical expectations. Specifically, based on strain theory (Agnew, 2006), we expect that students who are placed in a vocational track might have a higher level of depression, which in turn may be related to a higher level of deviance (see H2a and H2b paths in Figure 1); based on social control theory (Hirschi, 1969), we hypothesize that students who are in a vocational

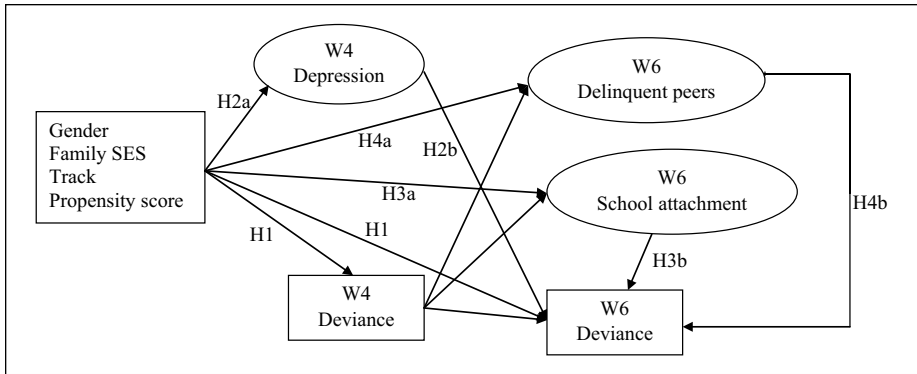


Figure 1. The theoretical mechanism linking tracking to deviance.
 Note. W4 = Wave 4; W6 = Wave 6; SES = socioeconomic status.

track will have lower school attachment, which is related to a higher level of deviance (see H3a and H3b paths in Figure 1); and according to social learning theory (Akers, 1998), we expect that students in a vocational track are more likely to associate with delinquent peers, which leads to a higher level of deviance (see H4a and H4b paths in Figure 1).

Method

Data and Sample

Data for the present study were drawn from the Taiwan Youth Project (TYP), which was conducted by the Institute of Sociology, Academic Sinica, Taiwan. The TYP was an 8-year longitudinal research project that began in 2000 and included two student cohorts: 2,690 first-year junior high school students (J1) and 2,890 third-year junior high school students (J3). The TYP used a two-stage stratified and clustered sampling design. In the first stage, the research team selected two counties (Taipei County and Yi-Lan County) and one city (Taipei) from northern Taiwan. They then divided the city of Taipei and Taipei County into three strata each, and divided Yi-Lan County into two strata based on different levels of urbanization. In the second stage, the clustering sampling method was used. Based on the proportion of students registered in each stratum relative to the entire student body in that county or city, the team decided the number of schools to be selected. After these, the team randomly selected schools from each stratum and two classes for each selected school (J1 and J3). All students in each selected class were recruited for the project.

The present study employed the J1 cohort (Wave 4-Wave 6),³ and all information about the variables used in the subsequent analyses emerged from the students' self-report surveys. At Wave 4, approximately 84% of the original sampled students had been retained ($n = 2,354$), and the present study was based on these subjects.

Missing cases were inevitable, as is common in longitudinal studies (e.g., due to attrition). To handle missing data, we identified 6 missing patterns, each of which has more than 50 missing cases.⁴ We analyzed these patterns and found some significant differences between missing and non-missing cases on deviance, tracking, gender, and mediating variables at the conventional level. However, some of the significant differences eventually become non-significant after a Bonferroni adjustment. This gives us some confidence that these missing data points might be missing at random (MAR). These missing cases were handled by using direct maximum likelihood to estimate parameters. This method was suitable for the present case because we intended to estimate a linear relationship among the variables in a structural equation model (SEM) framework (Allison, 2002).

Deviance (Wave 4 and Wave 6)

Four items are used to measure deviance. Specifically, students were asked in Wave 4 and Wave 6 to report whether they had engaged in four deviant acts: smoking, drinking alcohol, getting into fights, and drug use. Each of these selected deviance items was coded as yes (1) and no (0). We believe that these items are important because a recent study revealed that children and youths have become involved in more substance use and violence than before (Hou, 2003).

Although our measure involved mostly substance use items, the connection between substance use and delinquency is positive and strong, and research consistently shows that each behavior exacerbates the risk of expressing the other (Dembo, Schmeidler, Pacheco, Cooper, & Williams, 1997; Ellickson & McGuigan, 2000). Moreover, previous studies consider general delinquency as an outcome (Wiatrowski et al., 1982), whereas others examine specific acts of deviance, such as vandalism (Tygart, 1988) or violence (Akiba et al., 2002), but did not come to a conclusion on whether there exists a tracking-specific deviance relationship. In the subsequent analysis, we used the summation of the selected items (after natural log transformation) as our outcome. We used the natural log to transform the original scale so it would not depart from normality too much, so as not to violate the multivariate normality assumption of our analyses ($\alpha = .50$ for each wave).⁵

Educational Tracking (Wave 4)

As indicated in the review section, every student in Taiwan has to take a national entrance exam, and students are placed in three different tracks based on their scores: 3-year general high school (academic track), 3-year vocational school (vocational track), and 5-year junior college (vocational track). In Wave 4, the survey asked students to report what type of school they were in. Based on the responses to this item, students were grouped into two tracks: an academic track (0) and a vocational track (1). About 4% ($n = 99$) did not report their track placement at Wave 4. We went through Wave 5 and Wave 6 to locate these subjects, and used related information (e.g., school name) to impute these missing values. However, there were still some missing values remaining ($n = 78$), which were not included in the subsequent analysis.

Depression (Wave 4)

Adolescent depression in this study was measured through a short version (seven items) of the Symptom Checklist–90–Revised (SCL-90-R; Derogatis, 1983) administered in Wave 4. This short version scale consists of seven items asking students to report whether they have experienced depressive symptoms, and how serious the experience was in the past week (no; yes, but not serious; yes, a little bit serious; yes, serious; yes, very serious). Examples of the symptoms are headaches, loneliness, and depressed mood. We used these seven items to create three parcels. These three parcels were used as observable variables to measure our latent variable, depression ($\alpha = .74$).

Delinquent Peers (Wave 6)

We use delinquent peers to capture the central theoretical concept of social learning (Akers, 1998). This theory includes four important concepts: definition (e.g., attitude toward a particular behavior), differential reinforcement (e.g., the balance of actual or anticipated reward and punishment after an act), differential association (e.g., the balance of association with norm-abiding or lawbreaking friends), and imitation (e.g., engaging in a behavior after observing it; Akers, 1998). Although each concept has its merit, differential association, often operationalized through delinquent peers, is one of the most important concepts in the theory (Akers, 1998; Warr, 2002). Moreover, the measure used in the present study and previous studies was based on peers' delinquent acts, which are more influential toward one's behavior than non-behavioral measures (e.g., peers' opinions; Warr, 2002). We used six self-report items (e.g., smoking, or fighting) to measure the latent concept of delinquent peers ($\alpha = .67$).

School Attachment (Wave 6)

School attachment was measured by using three items: "I like school life," "I do not think I am a member of this school," and "I am not proud of my school." These items were used to capture students' recognition of and emotional attachment to school. The response categories ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). Hence, a higher score indicated higher school attachment. Although these items have not been commonly used in the literature, the face meaning of these items represents the concept. Moreover, both exploratory and confirmatory factory analyses show that these items load well on one underlying construct. In the subsequent analysis, these items were used to measure latent school attachment ($\alpha = .64$).

Control Variables (Wave 4)

In this study, we have two control variables: family income and gender. Family income was measured by students' self-reported family income level. This item has 13 income levels, from monthly income lower than 30,000 New Taiwan Dollars (1) to monthly income more than 150,000 New Taiwan Dollars (13). Gender was male (1) and female (0) and was evenly distributed (male = 50%).

Table 1. Frequency Distribution and Descriptive Statistics of Variables.

Gender	<i>n</i>	%	Intactness	<i>n</i>	%
Female	1,083	50	Academic	1,045	48.2
Male	1,085	50	Vocational	1,123	51.8
Total	2,168	100	Total	2,168	100%

Variables	Maximum	<i>M</i>	<i>SD</i>
Income	13	3.90	2.972
Wave 4 delinquency	1.61	0.101	0.279
Wave 6 delinquency	1.61	0.256	0.403
Depression	22	2.29	3.079
Delinquent peers	6	0.62	1.051
School attachment	12	6.01	1.595

Note. For latent variables, the reported numbers are based on summation of individual items. For descriptive statistics, the reported numbers are based on different same cases because of missingness.

Besides these two demographic variables, we included propensity score⁶ of educational tracking as another control variable in the SEM. Our major predictor, educational tracking, is a dichotomized variable and is time invariant; including propensity score can reduce selection bias (Berk, 1983; D'Agostino, 1998; Rosenbaum & Rubin, 1983). Hence, the effect of educational tracking on subsequent variables (e.g., deviance) can be allocated with more confidence to educational tracking (see Table 1 for descriptive statistics and frequency distribution of all variables).

Analytic Plans

The purposes of this study were to establish the relationship between educational tracking and adolescent deviance, and then to further investigate the mediating mechanisms that link tracking to deviance through depression, low school attachment, and delinquent peer association. To achieve these goals, the study uses a SEM through Mplus 6.0 (Muthén & Muthén, 2010) to test the theoretical model in Figure 1. Using SEM as a vehicle to examine the research questions presented here has two advantages. First, SEM and path analysis are commonly used to identify causal relationships and to test theoretical models among manifested and latent variables (Kline, 2005; Raykov & Marcoulides, 2000). Second, the model here also specifies mediating effects among theoretical variables, and James and Brett (1984) suggest that researchers use path analytic techniques to assess mediation. To evaluate the significance of the indirect effects, we employed bootstrapping to create a 95% confidence interval (CI) for indirect effects (Fritz & MacKinnon, 2007).

Results

We first present the basic model, with only the control variables, educational tracking, and Wave 4 deviance and Wave 6 deviance in the model. The upper panel of Table 2

Table 2. The Path Model With Tracking, Deviance, All Mediating Variables, and Control Variables (*N* = 2,168).

Exogenous variables		Endogenous variables			
Model 1	Wave 4 deviance	Wave 6 deviance			
Male	.077 (.012)**	.053 (.019)**			
Family income	<i>ns</i>	<i>ns</i>			
Vocational track	.054 (.013)**	.048 (.021)**			
Propensity score	.142 (.031)**	.115 (.052)**			
Wave 4 deviance		.497 (.038)**			
Model 2 ^a	Depression	Delinquent peers	School attachment		
Male	-.625 (.066)**	.320 (.065)**	-.098 (.033)**		
Family income	-.027 (.011)*	.021 (.011)*	<i>ns</i>		
Vocational track	<i>ns</i>	.212 (.067)**	-.083 (.034)**		
Propensity score	<i>ns</i>	<i>ns</i>	<i>ns</i>		
Depression		.081 (.025)**	-.060 (.013)**		
Wave 4 deviance	.082 (.007)**	.632 (.102)**	<i>ns</i>		
Model 3 ^b	Wave 4 deviance	Depression	Delinquent peers	School attachment	Wave 6 deviance
Male	.110 (.013)**	-.624 (.066)**	.336 (.066)**	-.098 (.033)**	<i>ns</i>
Family income	<i>ns</i>	-.027 (.011)*	.023 (.011)*	<i>ns</i>	<i>ns</i>
Vocational track	.061 (.014)**	<i>ns</i>	.230 (.068)**	-.082 (.034)**	<i>ns</i>
Propensity score	.150 (.032)**	<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>
Depression	.052 (.004)**		.090 (.026)**	-.062 (.013)**	.017 (.009)*
Delinquent peers					.216 (.026)**
School attachment					-.093 (.023)**
Wave 4 deviance			.413 (.099)**	<i>ns</i>	.344 (.031)**

Note. Standard errors are in parentheses. *ns* = non-significant path; CFI = comparative fit index; RMSEA = root mean square error of approximation; CI = confidence interval.

^aThe fit indexes for this model were $\chi^2 = 244.63$ (95); $\chi^2/df = 2.58$; CFI = .974; RMSEA = .027; 90% RMSEA CI = [.023, .031].

^bThe fit indexes for this model were $\chi^2 = 477.72$ (105); $\chi^2/df = 3.60$; CFI = .956; RMSEA = .035; 90% RMSEA CI = [.031, .038].

p* < .05. *p* < .01

provides the results. We see that after controlling for the propensity score, educational tracking still exerts significant and positive effects on Wave 4 deviance ($\beta = .054$) and Wave 6 deviance ($\beta = .048$). In other words, students who are placed in a vocational track are more likely to commit deviant acts (e.g., smoking or drug use) than students in an academic track. This relationship takes into account possible self-selection effects, because we included propensity score, which modeled the selection into the track. In addition, family income did not exert any significant effects on deviance, but males were involved in more deviance than females ($\beta = .077$, Wave 4; $\beta = .053$, Wave 6). Consequently, Hypothesis 1 (two H1 paths in Figure 1) found support.

Next, we focus on the direct relationship between educational tracking and three outlined possible mediating variables and deviance, controlling for SES, gender, and propensity score. As shown in the middle part of Table 2, we found that tracking has

no significant effects on depression, and the sign is negative (not shown). This result is inconsistent with our expectation and GST's prediction, and does not support our hypothesis (Path H2a in Figure 1) that educational tracking should have significant effects on depression. With regard to the other two mediating variables, the relationships between tracking and delinquent peers ($\beta = .212$) and school attachment ($\beta = -.083$) are as expected. Students from the vocational track are more likely to have delinquent peers and to have a lower level of emotional attachment to their schools than students from the academic track (H3a and H4a paths in Figure 1). More importantly, these relationships are still significant after controlling for the propensity score. In addition, Wave 4 deviance also exerts a significant effect on delinquent peers ($\beta = .632$) but not on school attachment.

The bottom part of Table 2 shows the results of the full model, where Wave 6 deviance was added. We see that these three mediating variables all exert significant effects on Wave 6 deviance ($\beta = .017$ for depression, $\beta = .216$ for delinquent peers, $\beta = -.093$ for school attachment). In other words, as expected, students who have a higher level of depression, more delinquent peers, and a lower level of school attachment are involved in more deviance than students who do not have these deficits (H2b, H3b, and H4b paths in Figure 1). The results are consistent with previous studies; for example, the positive depression–deviance relationship echoes the acting out hypothesis, which argues that deviance or delinquency is an outward presentation of an inward problem (depression; Vieno, Kiesner, Pastore, & Santinello, 2008). In addition, we see that after including these mediating variables, tracking lost its influence on Wave 6 deviance, which suggests that educational tracking erodes students' other life domains that are risk factors for deviance. Finally, after controlling all variables, Wave 4 deviance has significant effects on later deviance among adolescents, and among all variables, Wave 4 deviance has the strongest effects on Wave 6 deviance ($\beta = .344$). The results from the analyses show support for social learning (Akers, 1998) and social control (Hirschi, 1969) theories; however, the hypothesis derived from strain theory was not supported.

Table 2 indicates that tracking has both direct and indirect effects on deviance. This warrants further examination of the indirect effects among tracking, deviance, and proposed mediating variables, because we do not know whether these indirect effects are significant or not. We used bootstrapping to create a confidence interval for each of the hypothesized indirect effects: from tracking to delinquency via depression, delinquent peers, and school attachment (Table 3). As can be seen, most of the indirect effects from tracking to deviance are small, albeit significant. For example, the indirect effect from tracking to Wave 6 deviance through school attachment is only .008 (95% CI = [.001, .016]). In contrast, the effect from tracking to Wave 6 deviance through delinquent peers is moderate, at .050 (95% CI = [.017, .086]). In addition, we also found a significant indirect effect from Wave 4 deviance to Wave 6 deviance, .021 (95% CI = [.011, .032]). That is, educational tracking has direct effects on Wave 4 deviance and indirect effects on Wave 6 deviance through Wave 4 deviance. Although we found significant indirect effects based on the confidence interval, the magnitude is small when compared with direct effects. Hence, we see that tracking has a stronger

Table 3. The Significant Indirect Effects of Strains on Deviance Through Mediating Variables.

Paths	Wave 4 deviance	Wave 6 deviance
Tracking → depression	-.007 [-.014, 0]	—
Tracking → delinquent peers	—	.050 [.017, .086]
Tracking → school attachment	—	.008 [.001, .016]
Tracking → Wave 4 deviance	—	.021 [.011, .032]

Note. 95% confidence intervals are in the brackets. Bootstrapping with 5,000 draws. — indicates that the path is not estimated or not significant.

direct effect on deviance than indirect effect.⁷ These results also support the argument that educational tracking has profound effects on one's various life domains (e.g., the individual domain and social domain).

Discussion and Conclusion

The question about the link between the school system (tracking) and deviance remains unanswered due to mixed results (Crosnoe, 2002; Febbo-Hunt, 2003; Lotz & Lee, 1999; Van Houtte & Stevens, 2008; Wiatrowski et al., 1982). The present study makes several contributions to untangling this relationship between educational tracking and deviance. First, it employs a longitudinal data set to disentangle the knotty relationship between deviance and educational tracking. We also included three major life domains of an adolescent: depression (individual domain), delinquent peers (relational domain), and school attachment (social domain). In addition, we included both current deviance and later involvement in deviance. Second, we incorporated an individual's propensity score as a control; hence, the self-selection effect was minimized. Finally, the model is examined by using a Taiwanese sample, which provides a potential benchmark for cross-cultural comparison.

The results from SEM analyses indicate that in Taiwan, educational tracking is significantly related to juvenile deviance (substance use and fighting), and the relationship remains significant even when we take into account gender, SES, and propensity score. The propensity score provides information on the propensity of an individual to get placed in a vocational track. Hence, by including the propensity score in our model, we control for self-selection to some extent. The positive relationship between tracking and deviance was found at Waves 4 and 6. Consequently, Hypothesis 1 was found to be supported (e.g., supporting two H1 paths in Figure 1). Combining these results with previous studies from Western societies (Akiba et al., 2002; Tygart, 1988), educational tracking may be seen as a risk factor for unconventional adolescent behavior across cultures. Although the empirical studies and theoretical perspectives we review here do not focus on specific effects (e.g., tracking—substance use), our outcome measure involves mostly substance use. When analyzed separately (results not shown), the results are very similar to the present results; that is, educational tracking is positively related to substance use and violent deviance (e.g., fighting). Combined

together, we see that educational tracking influences both general deviance and specific deviant acts, such as substance use.

Although there might be good intentions behind educational tracking, the negative outcomes may need to be taken into account when employing this practice. One possible remedy is to offer more resources to vocational tracks so that students located in these tracks may receive better training and/or educational quality. Unequal resource allocation has been found by a study in Taiwan, which argues that students in vocational tracks, on average, pay more tuition but enjoy fewer educational resources than their counterparts in academic tracks (Lyau & Liu, 2004).

In the subsequent model, we find that tracking is related to deviance indirectly through its impact on delinquent peers and school attachment. Specifically, students in vocational tracks are more likely to have deviant friends (e.g., using drugs) and low school emotional attachment (e.g., does not consider oneself a school member) than students in academic tracks (supporting H3a and H4a in Figure 1). These two variables, in turn, are positively related to deviance (supporting H3b and H4b in Figure 1). The prevalence of deviance in vocational school in Taiwan can thus be partially attributed to low school attachment and having delinquent friends, both of which co-occur with being enrolled in a vocational school. According to social learning theory (Akers, 1998), the influence of differential association is heightened if the group is primary and if individuals associate with such a group with high frequency and intensity, and long duration. Given the context in Taiwan, where students are interacting with the same classmates over 3 years and for long hours per day, usually 9 hr, it is not hard to understand the influences of peers on adolescents' behavior. Furthermore, social control theorists argue that if youngsters do not identify with or endorse the values that conventional institutes try to portray, they may not be committed to or involved in the institutes. Yogan (2000) stated that "[I]ncreasing the bonds that students form to school through teachers is made difficult by the process of tracking" (p. 113). Consequently, we found that educational tracking can harm students not only by increasing involvement in deviance but also by increasing delinquent peer association and lowering school attachments, which are all risk factors for deviance.

Putting our results back into a life course perspective, on one hand, Sampson and Laub (2005) argued that each life stage has different important social and contextual factors which interact (age-graded) to shape one's life course and trajectories, especially institutional turning points. On the other hand, Piquero and Moffitt's (2005) theory suggests that a central life-event may trigger various negative social environments (e.g., delinquent peer associations) and close out other choices (e.g., education), which escalates one's delinquency trajectory. With regard to the former, this study shows that educational tracking is one such institutional turning point because it has profound influences on adolescents' future development, and cross-tracking seldom happens (Yi et al., 2012). For the latter, educational tracking also influences one's school attachment and association with delinquent peers, and these factors are connected to adolescent deviance. In addition, in Chinese culture, which values education, educational tracking may be an acute life-event or turning point for adolescents compared with other societies. Taken together, we suggest that while turning points and

crucial life-events may be important for understanding one's life trajectory, what events should be considered turning points may vary cross-culturally.

Although we found support for our hypotheses, some notes of caution must be raised here. First, our research intention is to point out there may be some differences between students in the vocational and regular high schools. By drawing attention to this, it is hoped to bring this situation to other researchers' attention for further investigation. Certainly, many vocational high school students perform well academically, and many high school students are involved in various forms of delinquency. However, our perspective is that, on average, the opposite situation is more prevalent. That is, more students in regular high schools perform well academically than those in vocational high schools, and vocational high school students are involved in more acts of delinquency than regular high school students. For example, Chou et al. (2006) found that the prevalence of substance use (e.g., smoking, and alcohol use) is higher in vocational high schools than in regular high schools. Similarly, Liao's (2005) studies found that regular high school students have, on average, a better grasp of physics concepts than vocational high school students. Second, the Taiwanese government has made strong efforts to expand vocational education in recent years with cultural settings emphasizing educational attainment, which leads to a higher rate of entering a university for both tracks (83.9% for high school graduates, 76.5% for vocational graduates). Consequently, differences exist, but are not great, as far as attending a university is concerned.

Surprisingly, we found no support for the hypothesis that students in a vocational track would have a higher level of depression (H2a path in Figure 1). Although this path is marginally significant, in a sample size like this study's, it is considered insignificant. However, we notice that tracking is negatively related to depression. This result indicates that students in a vocational track have lower levels of depression than students in academic tracks. One possible explanation is that students in academic tracks, although just having passed the entrance exam, still have a larger exam waiting for them, the college entrance exam. Hence, parents and teachers usually have high expectations and put great pressure on students in academic tracks. Consequently, students in an academic track may experience higher levels of depression than students in vocational tracks.

Although our study sheds further light on the issue of educational tracking, some limitations must be addressed. First, we did not include other possible theoretical concepts in this study, such as self-image. Previous studies included self-esteem as a measure of self-image, but did not find that self-esteem mediates the tracking–delinquency relationship (Van Houtte & Stevens, 2008; Wiatrowski et al., 1982). Other self-image concepts may play an important role, such as futility (Van Houtte & Stevens, 2008). Second, although we have longitudinal data to make conclusion of a causal relationship more appropriate than from cross-sectional data, SEM analysis only indicates inter-individual differences. It will be useful if we can adopt a more dynamic perspective, such as a growth curve. Third, all our analyses were based on students' self-reports, which could cause a common method variance (CMV) problem. However, while this may threaten our results, we must mention that our major predictor, track placement, although based on students' self-reports, was objectively checked by

school names. As such, the influence of any CMV on our main results should be minimal.⁸ Possible CMV effects might be present for other constructs, such as deviance, school attachment, depression, and delinquent peers. We used the “single-method-approach” (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) to check for possible effects. Following Carlson and Kacmar (2000), we did not find such effects.

Notwithstanding these limitations, we show that tracking not only directly increases involvement in deviance but also indirectly increases deviance by lowering students’ school commitment (e.g., not studying hard), supplying deviant classmates, and lowering the probability of getting into college. Moreover, we also show that tracking, as an important life-event or turning point, has profound effects on individuals, not only concurrently but also longitudinally. Future studies should build on our results to further investigate this issue by introducing other important theoretical mechanisms (e.g., self-image) and/or cultural influences (e.g., prestigious schools vs. non-prestigious schools).

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Notes

1. Educational tracking here refers to sorting students into different classes wherein curricula are different. However, it also means to place students into different educational systems in Taiwan, which will be discussed in more detail later. Educational tracking may also be referred to as “streaming” or “ability grouping.”
2. Based on the anomie/strain theory argument, students in a low track equally internalize the “success” standard that the society has instilled in them, but they find that they have no equal opportunity to realize such a goal (Merton, 1938). This strain perspective rests on achieving a universal goal. If, however, students do not internalize a similar goal, they will have no problem staying in a particular track, as one anonymous reviewer rightfully noted. To distinguish those who experience strain and those who do not is beyond the scope of this study, but such a point is an important and interesting research topic. However, we would suggest that staying in a vocational track may not be so stressful for some, but may be a strain for many in Taiwan and many Asian countries because of the cultural emphasis on academic success. This cultural emphasis makes tracking a strain. Furthermore, tracking placement is based on the national entrance examination; hence, comparison and ranking is presented, which makes it more or less a strain.
3. Although the Taiwan Youth Project (TYP) data provided rich information about surveyed students, we focused on the J1 (first-year junior high school students) cohort and Wave 4 to Wave 6 data for two reasons. First, J1 had a different entrance examination system, so J1 students were in junior high school for 3 years to prepare for this different entrance examination. Hence, the mentality of this cohort is different from the J3 (third-year junior high school students) cohort. As such, J1 students provide more pre-tracking information

- to create a propensity score model, so J1 is deemed to be suitable for the present study. Second, Wave 4 to Wave 6 provided great information regarding students' behavior, and more importantly, most students were still in school and reachable, which led to low attrition.
4. One might suspect a possibly biased estimation because of the high attrition rate. Recently, G.-X. Lin and Lee (2013), using GMM (growth mixture model), revealed three missing trajectories of the J1 cohort, and the estimation of the influences of these trajectories on four important variables, deviance, depression, self-worth, and happiness, only showed minor differences. Consequently, we proceeded to subsequent analysis with some confidence that our estimation should not be biased too much. However, readers should keep in mind that there remained some differences between "remainers" and "leavers." That is, "remainers" were less delinquent than "leavers" and were more likely to be in school.
 5. We submitted these four items to explanatory factor analysis, and the results showed one factor solution with acceptable loadings for each item (ranging from .40 to .75). Although factor analyses indicated that these items could be used to create a scale, the reliability is at a low level. Before transformation, the skewness and kurtosis are 3.57 and 14.68, respectively, for Wave 4, and 1.80 and 3.10, respectively, for Wave 6. The transformation decreases these figures but still somewhat departs from normal distribution (Wave 4: 2.71 and 6.61, respectively; Wave 6: 1.20 and 0.07, respectively). However, Kline (2005) argued that the distribution of variables can be regarded as normal when skewness and kurtosis are less than 3 and 10, respectively, in a structural equation model (SEM) framework. For parsimony, in the main context, we presented the results that used this scale. Furthermore, the analyses of separate deviant acts as outcomes showed essentially the same results. These results can be requested from the first author.
 6. For the propensity score model, we included several important variables that are related to educational tracking. These variables are family SES (socioeconomic status), students' gender, school performance during junior high school, and deviance (e.g., substance use, fighting, and skipping class) during junior high school. Each of these variables has been documented to influence tracking placement. As reviewed in this research, educational tracking is seen as a mechanism of status reproduction (Gamoran, 1992; Rowan & Miracle, 1983; Vanfossen, Jones, & Spade, 1987). In a patriarchal society, such as the Chinese culture in Taiwan, gender might play a role in influencing track placement. Although there may be many different criteria influencing track placement, school performance is among the most important factors (Oakes, 1985), and many previous studies have shown that delinquency is negatively related to school performance (Lucia, Killias, & Junger-Tas, 2012).
 7. This conclusion is based on the percentage of the total effect that is accounted for by the direct effect when compared with the indirect effect. This result can be obtained upon request.
 8. Although the common method variance (CMV) effects should be a concern when conducting research, a recent study by Spector (2006), after showing the result of one study in the review, stated that "a self-report methodology is no guarantee of finding significant results . . ." (p. 224). He then suggested that CMV existed in some circumstances, but was not universal, which is consistent with a previous meta-analysis (Crampton & Wagner, 1994).

References

- Agnew, R. (2006). *Pressured into crime: An overview of general strain theory*. Los Angeles, CA: Roxbury.

- Akers, R. (1998). *Social learning and social structure: A general theory of crime and deviance*. Boston, MA: Northeastern University Press.
- Akiba, M., LeTendre, G. K., Baker, D. P., & Goesling, B. (2002). Students victimization: National and school system effects on school violence in 37 nations. *American Educational Research Journal, 39*, 829-853.
- Allison, P. D. (2002). *Missing data* (Sage University Paper Series on Quantitative Applications in the Social Sciences, 07-136). Thousand Oaks, CA: SAGE.
- Ansalone, G. (2004). Educational opportunity and access to knowledge: Tracking in the US and Japan. *Race, Gender & Class, 11*, 140-152.
- Berk, R. A. (1983). An introduction to sample selection bias in sociological data. *American Sociological Review, 48*, 386-398.
- Beyers, J. M., & Loeber, R. (2003). Untangling developmental relations between depressed mood and delinquency in male adolescents. *Journal of Abnormal Child Psychology, 31*, 247-266.
- Bond, M. H., & Hwang, K. K. (1986). The social psychology of Chinese people. In M. H. Bond (Ed.), *The psychology of the Chinese people* (pp. 107-170). New York, NY: Oxford University Press.
- Busch, F. N. (2009). Anger and depression. *Advances in Psychiatric Treatment, 15*, 271-278.
- Carlson, D. S., & Kacmar, K. M. (2000). Work-family conflict in the organization: Do life role values make a difference? *Journal of Management, 26*, 1031-1054.
- Chang, Y.-H., Hsueh, C.-T., & Hwang, Y.-J. (1996). 教育分流與社會經濟地位：兼論對技職教育改革的政策意涵 [Educational tracking and social economic status: The meaning of vocational education policy reform] (教改叢刊 AB09), Taipei: Excutive Yuan.
- Chen, C.-Y., & Tung, Y.-Y. (2006). 家庭、學校及同儕因素與國中聽覺障礙學生偏差行為之關聯性研究 [The impact of family, school and peers on delinquency in deaf junior high school students]. *Bulletin of Special Education, 30*, 181-201.
- Cheung, C.-K., & Rudowicz, E. (2003). Academic outcomes of ability grouping among junior high school students in Hong Kong. *The Journal of Educational Research, 96*, 241-254.
- Chou, Z.-Y., Lee, M.-P., Liang, W.-M., Kuo, H.-H., Chang, L.-H., Lai, J.-S., . . . Kuo, H.-W. (2006). Prevalence of smoking, alcohol consumption, betel nut chewing and illicit drug use among adolescents in Taiwan. *Mid-Taiwan Journal of Medicine, 11*, 177-186.
- Chueh, H.-J. (2001). 青少年因應壓力行為之探討-憂鬱情緒與偏差行為 [A study on adolescent coping behaviors toward life pressures-depression symptom and delinquent behavior] (Unpublished master's thesis). Soochow University, Taipei, Taiwan.
- Cloward, R., & Ohlin, L. (1960). *Delinquency and opportunity*. Golencoe, IL: Free Press.
- Cohen, A. K. (1955). *Delinquent boys*. Golencoe, IL: Free Press.
- Crampton, S. M., & Wagner, J. A., III. (1994). Percept-percept in inflation in microorganizational research: An investigation of prevalence and effect. *Journal of Applied Psychology, 79*, 67-76.
- Crosnoe, R. (2002). High school curriculum track and adolescent association with delinquent friends. *Journal of Adolescent Research, 17*, 143-167.
- D'Agostino, R. B., Jr. (1998). Propensity score methods for bias reduction in the comparison of a treatment to a non-randomized control group. *Statistics in Medicine, 17*, 2265-2281.
- Dembo, R., Schmeidler, J., Pacheco, K., Cooper, S., & Williams, L. W. (1997). The relationship between youths' identified substance use, mental health or other problems at a juvenile assessment center and their referrals to needed services. *Journal of Child & Adolescent Substance Abuse, 6*, 23-54.

- Derogatis, L. R. (1983). *SCL-90-R: Administration, scoring, and procedures manual-II* (2nd ed.). Towson: Leonard R. Derogatis..
- Dryfoos, J. G. (1990). *Adolescents at risk: Prevalence and prevention*. Oxford, UK: Oxford University Press.
- Eccles, J. S., & Roeser, R. W. (2009). Schools, academic motivation, and stage-environment fit. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of Adolescent Psychology: Vol. 1. Individual bases of adolescent development* (pp. 404-434). Hoboken, NJ: John Wiley.
- Elder, G. H., Jr. (1998). The life course as developmental theory. *Child Development*, *69*, 1-12.
- Ellickson, P. L., & McGuigan, K. A. (2000). Early prediction of adolescent violence. *American Journal of Public Health*, *90*, 566-572.
- Farrington, D. P. (2005). The integrated cognitive antisocial potential (ICAP) theory. In D. P. Farrington (Vol. Ed.), *Advances in Criminological Theory: Vol. 14. Integrated developmental & life-course theories of offending* (pp. 73-92). New Brunswick, NJ: Transaction.
- Febbo-Hunt, M. (2003). *The other side of tracking: Curriculum tracking and the pathway to delinquency* (Unpublished doctoral dissertation). North Carolina State University, Raleigh.
- Fergusson, D. M., & Horwood, L. J. (1995). Early disruptive behavior, IQ, and later school achievement and delinquent behavior. *Journal of Abnormal Psychology*, *23*, 183-199.
- Friedkin, N. E., & Thomas, S. L. (1997). Social positions in schooling. *Sociology of Education*, *70*, 239-255.
- Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science*, *18*, 233-239.
- Gamoran, A. (1992). The variable effects of high school tracking. *American Sociological Review*, *57*, 812-828.
- Gamoran, A., & Mare, R. D. (1989). Secondary school tracking and educational inequality: Compensation, reinforcement, or neutrality. *American Journal of Sociology*, *94*, 1146-1183.
- Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of crime*. Stanford, CA: Stanford University Press.
- Hargreaves, D. H. (1967). *Social relations in a secondary school*. New York, NY: Humanities Press.
- Hirschi, T. (1969). *Causes of delinquency*. Berkeley: University of California Press.
- Ho, D. Y. F. (1986). Chinese patterns of socialization: A critical review. In M. H. Bond (Ed.), *The psychology of the Chinese people* (pp. 1-37). New York, NY: Oxford University Press.
- Ho, H. Z., Chen, W. W., & Kung, H. Y. (2008). Taiwan. In I. Epstein & J. Pattnaik (Eds.), *Asia and Oceania: Vol. 1. The greenwood encyclopedia of children's issues worldwide* (pp. 439-464). Westport, CT: Greenwood Press.
- Hou, C. (2003). 青少年犯罪問題與政策現況。 [Current state of juvenile delinquency and policy]. *Criminal Justice Policy & Crime Research*, *6*, 131-148.
- Hsueh, C.-T. (1996). 影響國初中後教育分流的實證分析：性別、省籍、與家庭背景的差异 [Analyzing the family background effect on the tracking of post-junior high education]. *台灣社會學刊*, *20*, 49-84.
- Huang, F.-M., Yi, C.-C., & Yang, J.-C. (2008, June). *Educational tracking, high school employment and college entry in Taiwan*. Paper presented at the International Conference on Youth Studies, 2008, Taipei, Taiwan.
- James, L. R., & Brett, J. M. (1984). Mediators, moderators, and tests for mediation. *Journal of Applied Psychology*, *69*, 307-321.
- Kelly, D. H. (1978). Track position, peer affiliation, and youth crime. *Urban Education*, *13*, 397-406.

- Kleinman, A. (1986). *Social origins in distress and disease*. New Haven, NY: Yale University Press.
- Kline, R. B. (2005). *Principles and practices of structural equation modeling*. New York, NY: Guilford Press.
- Koh, K. B., Kim, C. H., & Park, J. K. (2002). Predominance of anger in depressive disorders compared with anxiety disorders and somatoform disorders. *Journal of Clinical Psychiatry*, 63, 486-492.
- Kubitschek, W., & Hallinan, M. (1998). Tracking and students' friendships. *Social Psychology Quarterly*, 61, 1-15.
- Lam, C. M. (2007). *Not growing up forever: A Chinese conception of adolescent development*. New York, NY: Nova Science.
- Lee, C.-Y. (2011). 影響台灣青少年偏差行為之貫時研究-以TEPS資料分析為例 [The panel study of the deviation behavior in Taiwan: Evidence from Taiwan education panel survey] (Unpublished master's thesis). National Chengchi University, Taipei, Taiwan.
- Liao, K.-S. (2005). *Research on the differences of physics concepts of the students who have finished their first years of physics learning in senior high and vocational high schools* (Unpublished master's thesis). National Taiwan Normal University, Taipei.
- Lin, G.-X., & Lee, Z.-W. (2013, November). 青少年成長計畫資料流失軌跡分析 [The analysis of the attrition trajectory of Taiwan Youth Project]. Paper presented at the Fifth Conference of Taiwan Youth Project, Taipei, Taiwan.
- Lin, T.-S. (2002). 高中/高職的公立/私立分流對地位取得之影響 [The effect of academic/vocational public/private tracking in status attainment]. *教育與心理學研究*, 25, 35-62.
- Lin, T.-S. (2004). 主觀教育評估：以台灣教育分流體制為例 [Subjective educational assessment: Using Taiwanese educational tracking as an example]. *市師學報*, 25, 35-62.
- Lotz, R., & Lee, L. (1999). Sociability, school experience, and delinquency. *Youth & Society*, 31, 199-223.
- Lou, Y., Abrami, P. C., & Spence, J. C. (2000). Effects of within-class grouping on student achievement: An exploratory model. *The Journal of Educational Research*, 94, 101-112.
- Lucas, S. R., & Good, A. D. (2001). Race, class and tournament track mobility. *Sociology of Education*, 74, 139-156.
- Lucia, S., Killias, M., & Junger-Tas, J. (2012). The school and its impact on delinquency. In I. H. Marshall, D. Enzmann, M. Killias, M. Steketee, & B. Gruszczynska (Eds.), *The many faces of youth crime: Contrasting theoretical perspectives on juvenile delinquency across countries and cultures* (pp. 211-235). New York, NY: Springer.
- Lyau, N.-M., & Liu, M.-S. (2004). 高職教育資源投入之比較分析 [A comparative analysis of the input of educational resources in Taiwan's academic and vocational education]. *教育政策論壇*, 7, 41-58.
- Mak, A., Heaven, P., & Rummery, A. (2003). The role of group identity and personality domains as indicators of self-reported delinquency. *Psychology, Crime & Law*, 9, 9-18.
- Merton, R. K. (1938). Social structure and anomie. *American Sociological Review*, 54, 597-611.
- Moffitt, T. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, 100, 674-701.
- Muthén, L. K., & Muthén, B. O. (2010). *Mplus user's guide: Statistical analysis with latent variables*. Los Angeles, CA: Author.
- Oakes, J. (1985). *Keeping track: How schools structure inequality*. New Haven, CT: Yale University Press.
- Ogders, C. L., Moffitt, T. E., Broadbent, J. M., Dickson, N., Hancox, R. J., Harrington, H., . . . Caspi, A. (2008). Female and male antisocial trajectories: From childhood origins to adult outcomes. *Development and Psychopathology*, 20, 673-716.

- Petersen, A. C., Compas, B. E., & Brooks-Gunn, J. (1992). *Depression in adolescence: Current knowledge, research direction, and implication for programs and policy*. New York, NY: Carnegie.
- Piko, B. (2000). Perceived social support from parents and peers: Which is the stronger predictor of adolescent substance use? *Substance Use & Misuse, 35*, 617-630.
- Piquero, A. R., & Moffitt, T. E. (2005). Explaining the factors of crime: How the developmental taxonomy replies to Farrington's Invitation. In D. P. Farrington (Vol. Ed.), *Advances in Criminological Theory: Vol. 14. Integrated developmental & life-course theories of offending* (pp. 51-72). New Brunswick, NJ: Transaction.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavior research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*, 879-903.
- Raykov, T., & Marcoulides, G. A. (2000). *A first course in structural equation modeling*. Mahwah, NJ: Lawrence Erlbaum.
- Reinke, W. M., & Walker, H. M. (2006). Deviant peer group effects in education. In K. A. Dodge, T. J. Dishion, & J. E. Lansford (Eds.), *Deviant peer influences in programs for youth: Problems and solutions* (pp. 122-140). New Brunswick, NJ: Transaction.
- Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika, 70*, 41-55.
- Rowan, B., & Miracle, A. W. (1983). System of ability grouping and the stratification of achievement in elementary schools. *Sociology of Education, 56*, 133-144.
- Sampson, R. J., & Laub, J. H. (2005). A general age-graded theory of crime: Lessons learned and the future of life-course criminology. In D. P. Farrington (Vol. Ed.), *Advances in Criminological Theory: Vol. 14. Integrated developmental & life-course theories of offending* (pp. 165-182). New Brunswick, NJ: Transaction.
- Schafer, W., & Olexa, C. (1971). *Tracking and opportunity: The locking-out process and beyond*. Scranton, PA: Chandler.
- Shek, D. T. L., & Lee, T. Y. (2007). Parental control and Chinese adolescents in the context of positive youth development programs in Hong Kong. In J. Merrick & A. Omar (Eds.), *Adolescent behavior research: International perspectives* (pp. 3-17). New York, NY: Nova Science.
- Spector, P. E. (2006). Method variance in organizational research: True or urban legend? *Organizational Research Method, 9*, 221-232.
- Tan, T.-W. (2011). 台灣地區高中生依附關係、自我概念與偏差行為關聯性之研究 [The study on the associations among attachment, self-concept and delinquency of senior high school students in Taiwan]. *青少年犯罪防治研究期刊, 3*, 41-80.
- Toby, J. (1957). Social disorganization and stake in conformity: Complementary factors in the predatory behavior of hoodlums. *Journal of Criminal Law and Criminology, 48*, 12-17.
- Tsai, S.-L. (2004). 高等教育的擴展對教育機會分配的影響 [Effects of higher education expansion on inequality of educational opportunity]. *台灣社會學, 7*, 47-88.
- Tygart, C. E. (1988). Strain theory and public school vandalism: Academic tracking, school social status, and students' academic achievement. *Youth & Society, 20*, 106-118.
- Vanfossen, B. E., Jones, J. D., & Spade, J. Z. (1987). Curriculum tracking and status maintenance. *Sociology of Education, 60*, 104-122.
- Van Houtte, M. (2004). Tracking effects on school achievement: A quantitative explanation terms of the academic culture of school staff. *American Journal of Education, 110*, 354-388.

- Van Houtte, M. (2005). Global self-esteem in technical/vocational versus general secondary school track: A matter of gender? *Sex Roles, 53*, 753-776.
- Van Houtte, M., & Stevens, P. A. J. (2008). Sense of futility: The missing link between track position and self-reported school misconduct. *Youth & Society, 40*, 245-264.
- Vieno, A., Kiesner, J., Pastore, M., & Santinello, M. (2008). Antisocial behavior and depressive symptoms: Longitudinal and concurrent relationship. *Adolescence, 43*, 649-660.
- Warr, M. (2002). *Companions in crime: The social aspects of criminal conduct*. New York, NY: Cambridge University Press.
- Wiatrowski, M. D., Hansell, S., Massey, C. R., & Wilson, D. L. (1982). Curriculum tracking and delinquency. *American Sociological Review, 47*, 151-160.
- Wu, C.-I., & Lei, M.-K. (2003). 青少年憂鬱症狀與偏差行為併發之關係機制 [Co-occurring depressive symptoms and delinquency in adolescents]. *Taiwanese Sociology, 6*, 119-175.
- Wu, M.-Y., & Jou, Y.-H. (2009). 台灣青少年的道德信念: 社會依附的影響 [Moral beliefs of adolescents in Taiwan: Impacts of social attachment]. *Taiwanese Sociology, 17*, 61-100.
- Yi, C.-C., Fan, G.-H., & Chang, M.-Y. (2012). The developmental outcome of Taiwanese youth: Effects of educational tracking during adolescence. In C.-C. Yi (Ed.), *The psychological well-being of East Asian youth* (pp. 157-184). New York, NY: Springer.
- Yi, C.-C., & Wu, C.-I. (2004). Taiwan. In J. J. Slater (Ed.), *Teen life in Asia* (pp. 223-241). Westport, CT: Greenwood Press.
- Yi, C.-C., Wu, C.-I., Chang, Y.-H., & Chang, M.-Y. (2009). The psychological well-being of Taiwanese youth: School versus family context from early to late adolescence. *International Sociology, 24*, 397-429.
- Yogan, L. J. (2000). School tracking and student violence. *Annals of the American Academy of Political and Social Science, 567*, 108-122.
- Zheng, G. (2003). The study of value of children: An international collaborative study and its progress in China. *Cross-Cultural Psychology Bulletin, 37*, 7-14.