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導致學生中輟的因素：一個後設分析

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摘 要

本研究從23篇研究中輟之論文計算865個效應量，以比較五個影響中輟因素之影響力。低的人口變項特性、不良的家庭社會化、不良的學校社會化、學生個人問題、及結交反社會同儕等五個因素對中輟的效應量平均約在0.2到0.44之間。但個人問題因素之次因素「不良學業表現」卻是唯一達到大效應量者(0.96)。似乎是五個因素的效果會累積到不良學業表現。最後學業表現單獨或與其他因素聯合而導致中輟。本研究之結果意涵著採取補救措施以改善有中輟危機學生之學業表現似乎應列為第一優先考量。

關鍵詞：中輟、後設分析、學業表現

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Factors leading to school dropout: A meta-analysis

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Abstract

To compare the magnitude of five factors contributing to school dropout by means of meta-analysis, 865 effect sizes were calculated from statistical data in 23 studies. In average, the five factors (low demographic characteristics, poor family socialization, poor school socialization, personal problems, and bonding to antisocial peers) contributed to high school dropout with a grand mean effect sizes of 0.37, ranging from 0.20 to 0.44, whereas the poor school performance of the factor "personal problems" was the distinctive subcategory that had a large effect size (0.96). It seems that influences of different factors may accumulate in the poor academic performance that alone or in accompany with other factors leads to dropping out of school. The result of the present study implies that remedial measurements to improve the school performance of a student at risk of dropout should be the first priority for the prevention of dropout.

Keywords: school dropout; meta-analysis; school performance

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Because of strong national interest in enhancing school completion for elementary and secondary school students, the problem of dropping out from school in this society has caused concern among scholars and policymakers. For the individual person, the consequences of dropping out include the underdevelopment of his human capital, inauspicious employment, and lower expected lifetime earnings (Catterall, 1987; Rumberger, 1987). In addition, dropouts experience higher levels of anxiety, depression, cognitive disorientation, and self-derogation after leaving school than non-dropouts do (Bates, 2002). For society, a higher dropout rate leads to social costs including unemployment compensation dependency and increased crime (Catterall, 1987).

Janosz, Blanc, Boulerice, and Tremblay (2000) classified dropouts into four types: the quiet, the disengaged, low achievers, and the maladjusted. Disengaged dropouts have a low commitment to school activities. Low achievers demonstrate not only a low commitment to education but also poor school performance. The maladjusted have the most negative profile, displaying a high level of school misbehavior in addition to weak school involvement and poor school per-

formance. It seems that those dropouts who could not be classified using the three above-mentioned types are classified by Janosz et al. as quiet dropouts, whose misbehavior and poor achievement are not as serious as those in the other three groups. They generally go unnoticed until they leave school.

Bates (2002) also proposes four types of dropouts: the delinquent, the actively phased-out, the passively phased-out, and the (psychologically) troubled type. In light of the definition of each type, it appears that the delinquent type is similar to the maladjusted, the actively phased-out type to the disengaged, and the passively phased-out to the low achievers of Janosz et al.'s typology. Many troubled dropouts may have histories of physical, emotional, or sexual abuse; neglect; or other traumas. Whether the troubled type is the counterpart of the quiet type is not clear.

Whatever type a dropout is classified, his or her decision to leave school might be caused by one, or more factors related to school, family, peers, and personal characteristics, among others. One primary and initial cause of dropping out might be academic and social disengagement from school or alienation from

school, that is, a lack of participation in social and academic activities in school. Social activities include extracurricular activities and peer interactions. Academic activities include responding to instruction and class requirements, being involved in homework, and other learning activities. The cumulative process of educational disengagement erodes school performance and subsequently evokes a feeling of dislike to school. Eventually, a student will voluntarily quit school or, when accompanied by problematic behaviors, be removed from school (see the theoretical review by Rumberger & Larson, 1998).

When a student has a poor school performance or engages in problematic behaviors, there are two forces that drive dropping out. One is the pushing force employed by the school to sanction poor performance or problematic behaviors by suspending, failing, or issuing poor grades to the student (Bowditch, 1993). The other is the pulling force coming from environments external to the school, such as holding a job, having to take care of a family member, becoming pregnant, or participating in activities with delinquent peer groups.

Battin-Pearson et al. (2000) have

identified five theories of high school dropout. Each theory reflects a distinct factor influencing dropout. The first four factors (general deviance, deviant affiliation, family socialization, and structural strains) can directly or through mediation by academic achievement (the fifth factor) indirectly contribute to dropout. The five theories are as follows:

1. General deviance theory: General deviant behaviors such as drug use, delinquency, and sexual behavior during adolescence may precede and have both a direct and indirect effect on school dropout.

2. Deviant affiliation theory: Bonding to antisocial peers may well affect both a teenager's academic achievement and his/her decision to drop out of high school.

3. Poor family socialization theory: Parental divorce, family stress, less parental behavioral control and acceptance may influence academic achievement; a low parental education and low parental expectations for their children will directly influence school dropout.

4. Structural strain theory: Gender, socioeconomic status (SES), ethnicity may have an effect on both poor academic achievement and dropping out.

5. Academic mediation theory: Aca-

ademic achievement was operationally defined as scores of standardized achievement tests or grades. This theory claims that the above-mentioned four theories may be associated with dropping out only through their effects on poor academic achievement.

Battin-Pearson et al. (2000) stated that their empirical data had only partially supported the academic mediation theory. They concluded that beyond poor academic achievement, engaging in deviant behavior, bonding to antisocial peers, and coming from a low SES family all directly increased the likelihood of dropping out of school.

No meta-analysis investigating the factors affecting dropout has previously been undertaken. The present study using the typologies of Janosz et al. (2000), Bates (2002) and the five theories identified by Battin-Pearson et al. (2000) as a framework intends to find out the influencing magnitude of each factor on dropout through a meta-analysis. However, Battin-Pearson et al.'s (2000) categorization has to be modified. Low SES and low parental education must be assigned to the same category, since parental education is an index of SES, and according to Newcomb et al.'s (2002) description, sexual

involvement should be classified among general deviance behaviors which also include delinquency, and drug use.

1. Method

1.1 Location of the Studies

Studies collected in the ERIC, EBSCOhost, Education Complete on-line, and ProQuest Dissertation Consortium databases were searched using the keyword query "dropout & school." A number of dissertations, theses, technical reports and empirical studies published in Taiwan which address the issue of dropping out, were provided by the National Dropout Recovery and Intervention Resource Center, National Taipei University. References in each selected article were further screened for relevance to the subject of dropping out.

To be selected for this meta-analysis, studies must have contained empirical data for the calculation of effect size, such as correlation coefficients, means, and standard deviations of dropout and compared (non-dropout) groups.

There are a variety of definitions of a school dropout, depending on how the authors defined it. For example, Morrow (1986) defined a dropout as student who was previously enrolled in a school but

has more than two weeks of consecutive unexcused absences, except for those caused by death or transfer to another school, before graduation. The period of absence from school was not consistent in each definition and whether the dropouts were first time dropout or more time dropout was not mentioned. What was consistent in different definitions was that the sampled dropouts did not stay in school at the time the research was conducted. Definitions used in the primary studies were accepted in the present research with the condition that the dropouts they sampled were in reality out of school. Studies comparing those who were at risk of dropping out but still in school, with normal students, were excluded.

1.2 Coding of Data

The data needed to be coded were: Article, definition of independent variable, N_e (number of subjects in dropout group), N_c (number of subjects in control group), Me (mean of dropout group), M_c (mean of control group), SDe (standard deviation of dropout group), SDc (standard deviation of control group), t -value, r , and χ^2 -value. The going to be keyed-in materials mentioned above were marked

by the present author in each located study and then keyed-in by the research assistant. As the assistant finished, the author checked article by article whether there were typing errors and corrected the errors immediately if he found them. Coding for all variables was based on the conception that positive higher scores reflect more likely to lead to dropping out.

1.3 Calculation of Effect Size

Equations for converting r , $\chi^2_{(1)}$, t , M , and SD into effect size were adopted from Cooper and Hedges (1994) and Hedges and Olkin (1985). Formulas were utilized depending on the nature of the data that were contained in the sampled articles. Formula (2) was preferred to formula (1) because the former gave more information. Formula (4) was utilized only if no means and standard deviation were given.

The following formulas were used in calculations.

$$es = \frac{Me - Mc}{SDc} \quad (1)$$

Where es = effect size, M_e and M_c are the means of the dropout and non-dropout groups, respectively. SD_c is the standard deviation of the non-dropout group.

$$es = \frac{M_e - M_c}{\sqrt{\frac{(n_e - 1)SD_e^2 + (n_c - 1)SD_c^2}{n_e + n_c - 2}}} \quad (2)$$

$$es = \sqrt{\frac{4(N-1)}{N}} \times \frac{r}{\sqrt{1-r^2}} \quad (3)$$

Where N is the sample size, and r is the correlation coefficient when both variables are continuous (Hedge & Olkin, 1985).

Formula (3) has taken sample size into consideration, because the significance of effect size could be influenced by sample size (Fan, 2001).

$$es = \frac{t(n_e + n_c)}{\sqrt{n_e n_c (n_e + n_c - 2)}} \quad (4)$$

$$es = \sqrt{\frac{4(N-1)}{N}} \sqrt{\frac{\chi^2}{N - \chi^2}} \quad (5)$$

Where χ^2 is the value of χ^2 -test on one degree of freedom.

Tabular results of a five-point Likert scale were recoded to form a dichotomous scale by merging, for example, “always,” “often,” and “sometimes” into one category, and “seldom” and “never” into another category. Similarly, in the case of the item “parent’s highest level of education,” where there were originally five categories (“did not finish high school,” “graduated from high school or equivalent,” “completed some college,” “graduated from college,” and “has a graduate

degree”), the first two categories were collapsed to form a new category, “did not go to college,” and the last three categories were combined to form the new category, “went to college or beyond.” Other χ^2 tables with more than one degree of freedom were also restructured to create a χ^2 with one degree of freedom, and the χ^2 values were recalculated.

If the data for an item contradicted theoretical expectations, the effect size was given a negative sign. For example, if the dropout group had higher scores than the graduate group in “parents had more reading time with child yesterday,” “having more adult care at home,” and “having internal locus of control”, a negative sign was assigned to the effect size.

Janosz et al. (2000) classified dropouts into four types: quiet, disengaged, low-achievement, and maladjusted. The direction (plus-minus sign) of an effect size was not the same in each of the four types. Because the 1974 sample of maladjusted dropouts had the highest percentage of correct classification for the prediction of different types of dropouts according to several prediction models presented in their study, the effect size of a variable was coded as negative in cases where a particular type of dropout di-

verged from the pattern of the maladjusted dropouts of the 1974 sample. Variables influencing or correlating with dropping out were classified into five factors: low demographic characteristics, poor family socialization, poor school socialization, personal problems, and bonding to antisocial peers. The definition and categorization of independent variables is presented in Table 1.

2. Results

Twenty-three studies were included in the meta-analysis of the present investigation. The total number of effect size was 865. The grand mean effect size was 0.365 with a standard deviation of 0.46. It was an effect size between small and medium according to Cohen's (1977) criterion. According to Cohen's judgment, an effect size of 0.8 is large, 0.5 is medium, and 0.2 is small.

To test whether the residuals were independently distributed, the autocorrelation of the residuals of the 865 effect sizes were calculated by means of ARIMA (autoregressive integrated moving average) procedure by using "center" which subtracts each effect size from the mean effect size (SAS Institute Inc., 1984). Lag 1 autocorrelation was found to

be significant, $r = .59$, standard error = .034. It indicated the violation of assumption of independent distribution of residuals and denoted that it was not suitable to apply parametric statistics to test the significance of group differences. Therefore a nonparametric statistics (Kruskal-Wallis Test) was utilized. The means, standard deviations, mean rank, and number of effect size of each factor leading to dropout are provided in Table 2. The median of the 865 effect sizes was 0.29. The result of Kruskal-Wallis Test, $\chi^2(4, N = 865) = 48.57, p < .001$, indicated that the difference between the mean rank of effect sizes of the five factors was significant. Post hoc comparisons using Mann-Whitney U test reveal that the mean rank of effect sizes of family factor was significantly smaller than that of the other four factors.

During the process of assigning the variables to the five factors, it was found that the five theories could not embrace all the variables and therefore further differentiation of each factor into subcategories was needed. The result is presented in Table 3. Table 3 provides mean, standard deviation, mean rank, and number of effect sizes of subcategories of each factor.

Table 1 Definition of independent variables

Factor	Subcategory	Definition and categorization
Demography	Family SES	Low family SES
	Family ethnicity	Hispanic, Black, or Aboriginal
	Personal overage	Older than the age of classmates
	Personal gender	Being a male
	School SES	Low average SES of students in a school
	School size	Large school size
Family	Inappropriate parental attitude	Parents lack active attitude toward the children's schooling including Low educational expectations or inspiration of parents on their children; low commitment of family non-conventionality (Non-conventionality was defined as self-fulfillment rather than conventionally valued occupational success, pro-naturalism, humanism, appreciation of here-and-now, anti-authority, gender egalitarianism, absence of acquisitiveness and possessiveness, acceptance of intuitive knowledge other than rational scientific knowledge)
	Poor family socialization practices	Parents lack the appropriate behavior modification techniques to cultivate children's value and willingness to fulfill school demands and obligations. It includes little parental support, parental punishments of a corporal or verbally abusive nature, bad or little communication with children, parents' use of alcohol, parental involvement in gambling, spending less time reading with children, engaging in fewer summer activities with children, less parental supervision, marital conflict, giving too much allowance to children. On the side of children: rebelliousness against parents, students lived away from the family, less attachment with parents, little feeling of acceptance by parents, dislike of parents,.
	Family disadvantages	Family disruptions, such as moving frequently, family stress, death or illness of family members; structural disadvantages, such as not living in an intact family, living in separation from parents, having more siblings
School	Weak promotion of learning	Teachers lack the appropriate behavior modification techniques to cultivate children's value and willingness to fulfill school demands and obligations. It includes little teacher support, school lacks academic pressure, less praise of effort by teachers, poor teacher-student relationship, school had low percentage in academic program, high student-teacher ratio. On the side of students: teachers would not listen me, teachers were less interested in me, low attachment to school, sense of school discipline as unfair and ineffective, perceived teacher quality low, high level of students being at risk, fewer social resources (getting help for school work or social problems), a sense of being put down by teachers, staff lacks commitment, school environment perceived by students as unsafe
Personal	Problem behaviors	Student has Drug abuse, high rate of nonviolent individual offense, high frequency of sexual involvement, disciplinary problems, serious trouble with the law, delinquency, having children

Table 1 Definition of independent variables (Continue)

Factor	Subcategory	Definition and categorization
	Psychosocial maladjustment	Student has teen stress, social anxiety, alienation, autism, denial, manifests aggressiveness, psychoticism, social maladjustment, and withdrawal
	Poor school performances	Student has low grades, low standardized achievement test scores, high number of failing grades, low self-reported grades, suspended or put on probation, grade retention
	Inadequate attitude, beliefs and motivation toward schooling	Student has external locus of control, low aspirations or expectations for education or occupation, going to high school was not student's own wish, low academic self-image, lack of conviction that completion of high school is means to fulfill career plans, dislike of school, lack of respect for authorities, Little religious practice, adherence to deviant norms, low self-esteem, low achievement motivation, desire to quit school, feeling of boredom in school, belief that truancy does not matter, low self-concept
	Less involvement in learning	Student has absenteeism, truancy, cutting or skipping class, less time spent on homework, taking less advanced math courses, less self-regulated learning, avoiding working hard in school, loitering, more time spent on outside work, more hours of TV-watching per day during weekdays, less participation in active leisure activities (such as sports) and more in passive activities (such as going to movies), not on the academic track
Peer	Bonding to antisocial peers	Student has deviant or dropout friends, identification with deviant peers, spent more time with deviant friends; Student's closest friend attends classes less regularly, closest friend gets poor grades, closest friend is not interested in school, closest friend does not plan to go to college

Table 2 Mean and mean rank of effect size of the five factors leading to school dropout

Factor	<i>M</i>	<i>SD</i>	<i>MR</i>	<i>K</i>
Demography	0.35	0.56	415	77
Family	0.20	0.26	334	204
School	0.42	0.33	523	32
Personal	0.44	0.52	472	478
Peer	0.32	0.29	432	74
Total	0.37	0.46		865

Note. *MR*= mean rank, *K* = number of effect size

2.1 Demographic factor

In terms of demography, gender and age had no effect on the likelihood of

dropping out. On the other hand, there were only two studies investigating the effect of “averaged school SES of students” and only one study investigating

Table 3 Mean and mean rank of effect size of subcategories of the three factors leading to school dropout

Factor	Subcategory	<i>M</i>	<i>SD</i>	<i>MR</i>	<i>K</i>
Demography					
	Familial demography				
	Low family SES	0.43	0.23	50	42
	Ethnicity (Hispanic, Black or Aborigines)	0.50	1.24	28	13
	Personal demography				
	Overage	0.06	0.27	22	10
	Gender (male)	0.05	0.13	16	8
	School demography				
	Low school SES	0.40	0.31	47	3
	Large school size	0.29		40	1
Family	Inappropriate parental attitude	0.37	0.26	146	7
	Poor socialization practices	0.16	0.25	93	161
	Family disadvantages	0.37	0.56	139	36
Personal	Problem behaviors	0.42	0.45	257	102
	Psychosocial maladjustments	0.26	0.26	193	67
	Poor school performances	0.96	0.72	367	80
	Inadequate attitude, beliefs and motivation	0.28	0.39	182	121
	Less involvement in learning	0.37	0.38	223	108

Note. *MR*= mean rank, *K* = number of effect size

that of “school size,” these four subcategories were not subjected to statistical analysis. The mean of the remaining of two familial demographic characteristics (SES and ethnicity) was 0.43 and 0.50, respectively. They approached a medium size according to Cohen’s (1977) criterion. This means that a student coming from a low SES family, belonging to an ethnic minority is more likely to drop out than his/her counterpart classmates.

2.2 Poor family socialization factor

A nonparametric Kruskal-Wallis test showed significant difference between the

means of the three subcategories of the family factor. $\chi^2(2, N = 204) = 21.95$ $p < .01$. The post hoc comparisons using Mann-Whitney U test showed that the mean rank or effect sizes of “inappropriate parental attitude toward children’s education” and “family disadvantages” were significantly larger than that of poor parental socialization practices.

2.3 Personal factor

Kruskal-Wallis test showed a significant difference between the means of the five subcategories of the personal factor. $\chi^2(4, N = 478) = 99.83$, $p < .01$. The post hoc comparisons using Mann-Whitney U

test demonstrated that the mean rank of effect sizes of the subcategory “personal attitude, belief, and motivation” was significantly smaller than that of the other four factors. It is worthwhile to note that poor school performance had an outstanding large effect size (0.96). Problem behaviors had the second largest effect size (0.42).

Mean effect sizes of different factors and their subcategories on the school

dropout were presented in the Figure 1.

3. Discussion

In scrutinizing Table 3, one can see that poor school performance is the distinctive subcategory that had a large effect size (over 0.8), whereas the remaining subcategories had medium or small effect sizes. In the study conducted by Battin-Pearson et al. (2000: 574) poor academic achievement also had the largest direct

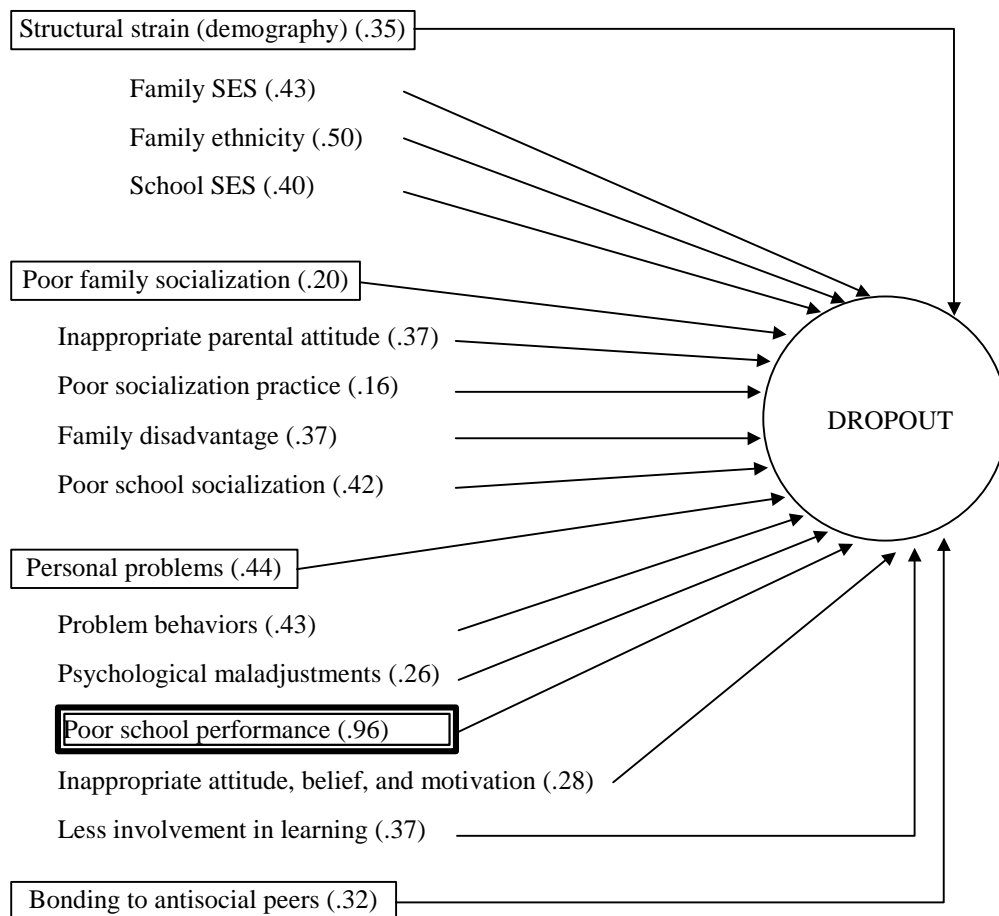


Figure 1 Mean effect sizes of different factors and their subcategories on the school dropout

path coefficient in their final model portraying factors leading to dropping out.

Generally speaking, the assertions of the five theories are confirmed by the results of the current study. Additionally, the results of the present study have been found to be consistent with previous relevant studies:

1. Deviant affiliation theory: Having bonding to antisocial peers had a mean effect size of 0.32 on dropping out, that is, having good friends who had the experience of dropping out or having deviant friends will increase the likelihood of dropping out of high school (Deng, 2001; Kasen, Cohen, & Brook, 1998), conversely, having academically high-achieving friends will decrease the likelihood of dropping out (Kasen et al., 1998). Therefore peers who contribute to dropout must be limited to deviant or antisocial peers.
2. General deviance theory: problem behaviors had a mean effect size of 0.42 on dropping out. It confirms the previous finding that delinquency, drug use, and teen births precede dropping out (Curtis et al., 1983; Deng, 2001; Kasen et al., 1998; Mensch & Kandel, 1988; Rumberger & Larson, 1998).
3. Academic mediation theory: The mean

effect size of the school performance was 0.96. It was the sole distinctive subcategory that had a large effect size in the present study. Poor academic achievement was regarded as important in the etiology of dropout (Griffin & Heidorn, 1996; Marjoribanks, 2002; Rumberger & Larson, 1998). The role of poor academic achievement as a mediator for the effect of deviant affiliation, personal deviance, poor family socialization, and structural strains on the dropout rate was not investigated in the present study because the present study is not a longitudinal study. But it seems that the effect sizes of all five factors may accumulate in the school performance that alone or in accompany with other factors leads to dropping out of school.

4. Poor family socialization theory: When familial demographic characteristics (SES and ethnicity) were assigned to the structural strains theory as the present study did, the poor family socialization (inappropriate parental attitude, family disadvantage, and poor socialization practices) was least supported by the results of the present study (the mean effect size was only 0.20). In Battin-Pearson et al.'s (2000) descrip-

tion, variables such as parent's own education (an indicator of SES), family stress, parent divorce (family disadvantages), parental behavior control and acceptance (poor family socialization practices) and parental expectations for their children's academic success (inappropriate parental attitude toward children's education) were included in the poor family socialization theory, that is, they included both the familial demography and socialization in the same category. In the present study, the subcategories "SES" and "ethnicity" were assigned to the factor "demography, which was explained by the structural strains theory. Although the effect was found small in the current study, the effect of poor family socialization confirms the results of previous studies (Marjoribanks, 2002; Rumberger, 1983; Teachman, Paasch, & Carver, 1996).

5. Structural strains theory: Two familial demographic characteristics, SES and ethnicity, had an effect of medium size of 0.43 and 0.50, respectively. They were as important as the problem behaviors in the contribution to the dropout. The effect of SES on the dropout supports the findings of previous stud-

ies (Mensch & Kandel, 1988; Peng & Lee, 1992; Rumberger, 1995; Rumberger & Larson, 1998).

Because the poor school performance had the only distinctive large mean effect size the result of the present study implies that remedial measurements for improving school performance of a student at risk of dropout should be the first priority for the prevention of dropout.

A methodological problem has to be discussed here. Normally it is that the larger the mean effect size, the larger the mean rank of effect size. However, in Table 2 and Table 3, there are some inconsistencies in the rank orders of mean and mean rank of the factors and the subcategories. For example, it can be seen in Table 2 that the personal problems had the highest mean effect size whereas poor school socialization had the highest mean rank. It might be caused by the heterogeneity of variance of residuals and outliers of the effect sizes. It is similar to the fact that in the post hoc multiple comparisons after one-way analysis of variance, different parametric statistics, such as Scheffé and Duncan, would result in different conclusions of significance test.

A limitation of this study that should be mentioned is that the studies collected

in the present meta-analysis may be not exhausted, although the present author has done his best. There might be some relevant articles published or unpublished in the USA and other countries that were not referred to in the present study. New relevant empirical articles may be added to the electronic databases. The present author desires only to make a modest but meaningful contribution to the accumulation of knowledge in the field of dropout study.

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