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家庭環境因素對於青少年藥物濫用之影響——一個後設分析研究

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摘 要

本研究報告是以美國本土青少年爲對象，共蒐集 32 篇相關論文，進行後設分析青少年藥物濫用與家庭環境之間的關係。研究結果如下：

1.以家庭結構（family structure）而言，共有下列的變項對青少年藥物濫用的機率具有顯著增進的作用。即：家庭是屬於高社經地位（含：家庭收入和父母教育程度）、父母死亡或父母不與青少年住在一起、家庭有藥物濫用者（如：父母或兄弟姊妹）、單親家庭者。只有兄弟姊妹是藥物濫用者對青少年的影響具有中等效果值，其餘的影響力，只具有小的效果值（effect size）。

2.以家庭關係（family relations）而言，令人訝異的是民主家庭（democratic family）的青少年卻具有較高濫用藥物的機會，此發現異於一般人認爲民主家庭會刪減青少年濫用藥物的機會；相對地，權威家庭（authoritarian family）與藥物濫用青少年之間不具顯著的正相關。然而放縱家庭（permission family）卻能昇高青少年濫用藥物的機率。

總之，在所有家庭環境的變項中，兄弟姊妹的影響力最大，所以，兄弟姊妹對青少年不良影響力是未來防患青少年使用藥物的重點之一。

關鍵詞：效果值、民主家庭、權威家庭、放縱家庭

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introduction

Adolescent drug use peaked in the late 1970s, declined somewhat, and then steadily increased during the 1980s and on into the early 1990s (McCoy, Metsch, & Inciardi, 1996). The rates of drug consumption in adolescents today are lower than they were in the early 1970s, but illicit drug use is still more dominant than it was before the late 1970s.

There is a substantial body of research on the relationship between adolescent drug use and family factors. Among these studies, many focus on the association of parental drug use, sibling drug use, single parenting, parents' education, and family income with adolescent substance use (Beardslee, Son, & Vaillant, 1986; Jurich, Polson, Jurich, & Bates, 1985), and several focus on the correlates of parental or family style on adolescent substance use (Brook, Whiteman, Gordon, & Cohen, 1986; Block, Block, & Keyes, 1988).

Emphasizing the correlates of family factors on drug use neither implies that the study of other factors(e.g., school, peer)are not important nor that the role of the family in adolescent drug use is anything but an enormously complex cluster of influences. In general, the family is broadly defined here to include extended families as well as any other patterns whose members identify themselves as a family. Family environment is broadly defined to include(a)family structure and(b) relations. Family structure indicates the *physical, concrete,* and *non-dynamic* descriptions of the family, such as family drug use, single parenthood, and socioeconomic status. Family relations are *dynamic* and *abstract,* such as family communication, parental style, and affectivity.

Adolescent Drug Use and Family Structure

Family structure consists of (a) family drug use (b) single parent vs intact family, (c) departing of family members, (d) socioeconomic status. Research exploring the correlates of family structure on adolescent drug use has a long and substantial history. Both Binion (1979) and Schultz and Wilson (1973) have failed to find any relationship between adolescent substance use and the number of family members. However, Johnson, Shontz, and Locke (1984) reported a statistically significant association between parental alcohol use and adolescent marijuana and alcohol use. In addition, Tec (1974) reported a positive association

between parental drug use and drug use by children. In contrast, Needle, McCubbin, Wilson, Reineck, Lazar, and Mederer (1986) and Tolone and Dermott (1975) reported that parental drug use is not related to child drug use. Research on the influence of single parenting on adolescent drug use has shown that intact two-parent families have a significantly lower percentage of child substance use than single-parent or non-intact families (Schaffer, 1988). Furthermore, Jurich P, Polson, Jurich A, and Bates (1985) found that most adolescents who use drugs are from divorced families or from families with a high frequency of parental absence or family break-ups. In contrast, Hoffmann (1991) found that one parent's death does not affect the initial use of marijuana in white adolescents.

In sum, the previous research findings on the relationship between adolescent drug use and family structure may or may not be significant. These contradictory findings imply that advanced study on this topic is recommended.

Adolescent Drug Use and Family Relations

Relatively few researchers have studied the correlates of family relations (e.g., parenting or family style including authoritarian family, democratic family, and permissive family) on adolescent substance use (Rees & Wilborn, 1983). For example, in a study on the correlates of parenting styles upon adolescents, Stanton (1979) associated more laissez-faire parent-adolescent relations with high marijuana use, while moderate marijuana users reported more parental negative control through punishment and autocratic relations with strict rules, and low marijuana users were associated with the democratic families in which their parents made well-established rules for them. Conversely, other investigators have found that the father's negative control was not associated with the use of tobacco, marijuana, and alcohol in male adolescents (Hundleby, 1987). Jurich et al., (1985) suggested that there is a communication gap between family members of adolescents who are chemically dependent. This is supported by findings that teenagers who abuse drugs typically describe their communication with parents as closed and unclear (Gantman, 1978; Rees & Wilborn, 1983) and have rigid patterns of communication (Streit, Stanton, & Todd, 1982). Parents have also reported communication problems. For example, a number of parents reported that they are inadequate in communicating trust, acceptance, and understanding (Rees & Wilborn,

1983). However, Koplin (1987) found that adolescents' use of alcohol, marijuana, and amphetamine was not related to parent-child communication.

In sum, there is no doubt that the relationship between adolescent drug use and family relations exists, but the statistical significance of its relationship is questionable. Just like the contradictory findings on family structure, the research findings on the relationship between adolescent drug use and family relations are inconsistent.

Limitations of Previous Primary Studies

These empirical studies on the relationship between adolescent drug use and family factors are limited by three related problems: (a) the lack of congruent findings among these studies, (b) the need for examining the overall correlates of family factors on adolescent drug use, and (c) the need to re-identify important variables within the family factors which may influence adolescent drug use present in these studies. Hence, there is a need for a method of literature synthesis to help to make sense of these discrepant findings. In general, there are two methods for reviewing literature. These include the narrative approach and the quantitative approach.

The narrative approach involves counting and comparing the number of previous statistically significant and nonsignificant findings in order to indicate whether the results of the research findings are statistically significant or not. For example, Denton and Kampfe (1994) conducted a narrative literature review using the vote-counting method to integrate the contradictory empirical findings related to the correlates of family variables on adolescent substance use. Unfortunately, this review suffered from three problems. One is that the authors selected only a few primary studies to integrate into their review. A second problem is that they attempted to review and integrate studies that were limited to literary, narrative approaches. These have been criticized as being inconsistent and subjective (Glass, 1977). A third problem is that it was not possible for them to examine the magnitude (strength) of the relationship between adolescent drug use and family variables by using vote-counting method. A quantitative method of synthesizing research can not only help to aggregate and analyze the conflicting evidence reported from the previous primary studies concerning adolescent drug use and family variables, but it can also attempt to address the

three problems identified above. In addition, it can provide clear summaries of necessary statistical data from the primary selected research.

Statement of the Problem

There are many discrepant findings in the research examining the relationship between family structure and relations and adolescent drug use. Hence, two questions need answering: (a) does family environment play an important role in adolescent drug use, and (b) are both family structure and family relations salient to adolescent drug-use behavior?

Purpose of the Study

There are no published studies using the meta-analytic approach applied to the topic of family factors and adolescent drug use. Meta-analysis would be used to summarize the effects of selected family variables on adolescent chemical use in a systematic and quantitative fashion.

One of the purposes of this study is to provide statistically based conclusions about the overall influence of family variables on adolescent substance use. Additionally, this study is designed to estimate the overall effect size of family factors, including family structure and relations, on adolescent drug use.

Research Hypotheses

This study would examine the following hypotheses:

(1) Overall, family environment will be predictive of adolescent drug use.

In this study, family environment will be constructed by two family factors, family structure and family relations. The factor of family structure includes five family variables: parents' socioeconomic status, departing of family members, parental drug use, sibling influence, and single parenthood. The factor of family relations includes two family variables: parental style and affectivity.

(2) Specific components of family factors will be associated with adolescent drug use.

(2a) An ineffective family structure will favor adolescent drug use.

(2b) Families with dysfunctional relations will lead to increased adolescent drug use.

(3) The relationship between family factors and adolescent drug use will be moderated by background characteristics, such as race and gender, and characteristics of the primary study, such as the type of data collection method, the type of publication data, the type of drug(s), and the source of data.

Operational Definitions

The following outline illustrates the operational definitions of family variables and their relatives.

I. Characteristics of Primary Study
 1. Types of data collection method
  survey only (paper and pencil, telephone)
  observation or interview included
 2. Types of drugs
  not specified (not reported)
  illicit and licit drugs
  licit drugs
  illicit drugs
 3. Source of data
  journal
  thesis or dissertation
II. Background Characteristics
 1. Gender
 2. Race
III. Explanatory Variables
  Family Structure
 1.Family drug use
  parents (mother, father)
  siblings (younger, elder)
 2. Single parent
  divorce
  remarriage
  live with step-father or step-mother

3. Departing of family members
   mother or father dead
   mother or father not living home with adolescent
4. Socioeconomic status
   parents' education
   parents'/family income
   Family Relations
1. Parenting styles
   authoritarian family: parents control through guilt, punishment, harsh (strict) discipline/rules or authority (dictation)
   democratic family: parents reason, well-established rules and discipline, encouraging to express and discuss openly
   permissive family: parents not making well-established rules, not making sure that their children follow these rules, less convention
2. Affectivity
   adolescent feelings of closeness to parents or family in positive or
   negative way
   positive: the feeling of love, warmth, affection, or support
   negative: the feeling detached, unsatisfied, disappointed, or angry

METHOD

The purpose of this study is to use the meta-analytic approach to examine the correlates of family factors with adolescent drug use/abuse. The method used in this study is combining and comparing significance levels and effect sizes as described by Rosenthal and Rubin (1986). This methodology consists of (a) trial identification, (b) trial selection, (c) data abstraction, and (d) statistical analysis (Petitti, 1994).

Trial Identification

As many studies as possible are retrieved for this meta-analysis. Since there is no way of deciding whether a group of located studies is representative of the entire population of existing studies on the topic, the best way is to locate as many studies as possible (Jackson, 1980). However, there is no absolute standard for how many of the primary studies are sufficient and appropriate for a meta-analysis (Dulak, 1995; White, 1994).

A comprehensive and thorough search for published studies examining the relationship

between family factors and adolescent drug use/abuse is conducted. Computerized searches include Educational Resources Information (ERIC), Psychological Abstracts and PsychINFO (PsychLit), Dissertation Abstracts International (DAI), Sociological Abstracts (SociFile), and LEARN (IBIS). In addition, the bibliographies of review articles, chapters, books, and journal articles located through computer searches are examined for studies which may meet inclusion criteria.

Trial Selection

The sample of primary studies is collected based on the selection criteria:

1. All primary studies must have been conducted in the United States and published in the English language or a thesis or dissertation published in the English language.
2. All studies must include adolescents between the ages of 11 to 17(or high school students).
3. The studies may include either licit or illicit drugs.
4. Studies must quantitatively assess outcomes on the correlates of family factors with adolescent drug use or must include quantitative data necessary for calculating effect sizes and significance levels.
5. The search for the studies includes the years from 1960 to 1997.

Data Abstraction

There are many study characteristics which may influence the results of primary empirical studies. In addition to the five selection criteria previously listed, one fundamental task of collecting data from primary studies is to ensure that the data of the primary studies are coded correctly for computing significance levels and effect sizes. In order to make full use of statistical methods in describing and communicating study findings and accounting for their variance, the characteristics of the primary study and the explanatory variables of family structures and family relations would be coded such that studies with similar characteristics would be consistently coded. All primary studies would be carefully reviewed to develop an appropriate coding sheet.

Reliability

In testing the interrater reliability of the coding, one doctoral student in the area of Instructional Technology of Northern Illinois University would be trained to independently code five randomly selected primary studies. The researcher would explain the process and purpose of coding to the independent rater and conducted a demonstration on how to code by coding one randomly selected primary study. The results of the corater and the researcher were compared using Cohen's kappa (Cohen, 1960) to estimate the intercoder reliability.

Statistical Analysis

Transformation of Statistics in Primary Study

Each primary study's data is transformed into standardized scores before calculating significance levels and effect sizes from each primary study.

Depending on how the primary study's data were reported, different formulae would be used to compute the standardized scores. The formulas described by Rosenthal and Mullen (1985) and Mullen (1989) are used to make the

Combining Significance Levels and Effect Sizes

The combination of significance levels indicates the likelihood that the results of the hypothesis test are due to chance. The combination of effect sizes provides an insight into the strength of the relationship between adolescent drug use and family environment, or family structure, family relations, and the subgroup of the family variables.

Homogeneity Test

The comparison of the effect sizes is used to determine whether each set of effect sizes in a sample shares a common effect size. The homogeneity statistic, Q, would be calculated according to the formula described by Rosenthal and Mullen (Rosenthal & Mullen, 1985). The null hypothesis is that the effect sizes are homogeneous. For purposes of this study, effect sizes would be considered homogeneous at $\underline{\rho}$ >0.05.

File Drawer Problem

To deal with this problem, Rosenthal (1979) demonstrated a statistical method to directly assess the threat posed by sampling bias in the literature search. This fail-safe number estimates the number of new, filed, or unretrieved primary

studies averaging null results that would be required to bring the overall combined probability level to the "just" significant convention of $\underline{\rho} = 0.05$.

Moderator Effects

The third research hypothesis tests whether selected characteristics of the primary studies are moderators of the overall effect. These assessments would be carried out to test if certain characteristics of the primary studies explain the variation of family factors effects presented in the primary studies. The difference between average effect sizes across primary studies is calculated.

This type of meta-analytic procedure is identified as a focused comparison of effect sizes (Mullen, 1989).

The effects of the background characteristics, such as race and gender, and the characteristics of the primary studies, such as data collection methods, publication date, types of drugs, sample size, and source of data, are estimated to see whether these effects moderate the relationship between adolescent drug use and family factors.

RESULT

The initial search for the studies included the years from 1960 to 1997. Thirty-two studies were conducted and identified on the basis of the study selection criteria from 1970 to 1994. These 32 valid studies were regarded as the study sample and include 30 journal articles, one doctoral dissertation, and one master's thesis, and produced 181 hypothesis tests.

Intercoder Reliability

The kappa coefficient in the five randomly selected studies was 0.83. This indicates a

relatively strong and acceptable level of agreement between the two coders. Therefore, only one coder was used for the remainder of the studies.

Research Hypothesis One

Based on the data presented in Table 1, the combination of significance levels of Z for the overall family environment is statistically significant ($\underline{Z}$ = -8.167, $\underline{\rho}$ < 0.05). The mean weighted effect size (Zfisher) is 0.0159, which can be interpreted as the magnitude of the overall relationship between adolescent drug use and the overall family environment. This Zfisher of 0.0159 corresponds to $\underline{R^2}$ = 0.0003 and $\underline{D}$ cohen = 0.0318. This represents less than a small effect size, according to Cohen's (1981) estimates of small, medium, and large effect size. This effect size was in the expected direction, indicating that the dysfunctional family environment was statistically significantly favorable for adolescent drug use, even though the strength of its effect was very small.

Table1 Combination and Comparison of Significance Levels and Effect Sizes for Family Environment

Condition of Family Environment	k	Z	Zfisher	R^2	Dcohen	95%CI	Nfs	χ^2 Qb	χ^2 Qw
Overall Family Environment	181	-8.167*	0.0159	0.0003	0.0318	-0.173/+0.238	27562		2024.49*
Data Collection Methods								2.6	
survey	154	-8.578*	0.0132	0.0002	0.0263	-0.197/+0.250	18621		1801.89*
interview	27	13.325*	0.1721	0.0291	0.3459	-0.196/+0.878	845		220.00*
Types of Drugs								123.32*	
not specified or	12	7.273*	0.0615	0.0038	0.1231	-0.682/+0.920	562		82.54*
reported	114	-12.775*	0.0008	0.0000007	0.0018	-0.256/+0.261	4024		1325.90*
illicit & licit drugs	15	6.257*	0.0773	0.0059	0.1547	-0.566/+0.867	220		83.14*
illicit drugs	40	16.261*	0.0765	0.0058	0.1531	-0.287/+0.591	3919		409.59*
licit drugs									
Publication Date								75.35*	
1970 - 1980	74	4.446*	0.0133	0.0002	0.0265	-0.296/+0.349	4912		644.98*
1981 - 1986	67	-12.275*	0.0161	0.0003	0.0322	-0.307/+0.371	1500		990.34*
1987 - 1992	38	13.488*	0.0495	0.0024	0.0991	-0.352/+0.548	2360		313.82*
1993 - 1994	2	8.581*	-0.2768	0.0728	-0.5608	-2.293/+1.652	52		0
Sample size								499.93*	
6 - 200	40	9.482*	0.1864	0.0339	0.3751	-0.071/+0.814	1519		125.36*
201 - 500	27	16.826*	0.1100	0.0120	0.2206	-0.318/+0.752	2890		163.15*
501 - 1500	60	15.102*	0.0269	0.0007	0.0539	-0.304/+0.411	4252		375.67*
1501 - 3000	34	12.576*	0.0292	0.0008	0.0585	-0.418/+0.533	1832		456.16*
3001 - 16502	20	-14.997*	0.0006	0.0000004	0.0013	-0.619/+0.621	1263		404.22*
Source of Data								8.92*	
journal	173	-8.220*	0.0153	0.0002	0.0305	-0.180/+0.241	23598		2014.40*
dissertation/thesis	8	5.151*	0.2262	0.0494	0.4562	-0.560/+1.423	145		1.17

(continued on following page)

Table1 (continued)

Condition of Family Environment	k	Z	Zfisher	R^2	Dcohen	95%CI	Nfs	χ^2 Qb	χ^2 Qw
Race								69.47*	
white	15	11.716*	0.2051	0.0409	0.4132	-0.321/+1.125	1022		104.97*
black	13	4.949*	0.1443	0.0205	0.2895	-0.492/+1.053	184		42.80*
mixed	153	-8.816*	0.0118	0.0001	0.0237	-0.200/+0.248	14318		1807.25*
Gender								10.93*	
male	9	7.772*	0.2539	0.0618	0.5133	-0.449/+1.427	191		13.15*
mixed (male & female)	172	-8.224*	0.0151	0.0002	0.0302	-0.181/+0.241	23055		2000.41*

Note: *$p < .05$; k = number of hypothesis test; Zfisher = mean of weighted effect size (weighted by sample size); R^2 = the square of correlation coefficient between adolescent drug use and family environment; Dcohen = mean Cohen's d (effect size); 95%CI = 95% confidence interval for Dcohen; Nfs = fail-safe number; χ^2 = chi-square = homogeneity statistic test (Qw = within-group, Qb = between-group).

The fail-safe number of effect sizes for the overall family environment that would be needed to be not statistically significant before one would conclude that the overall result of significance was due to sampling bias in the selected studies is Nfs = 27,562. The significance levels of the hypothesis tests are significantly heterogeneous and may be thought of as having been sampled from different populations. According to Shadish and Haddock's (1994) caution, the results of the heterogeneity of the effect estimates indicates that the mean of the weighted effect size (Zfisher) should not be explained as an estimate of a single population effect parameter, but rather as a description of the mean of the 181 observed effect sizes.

When the characteristics of the primary study, such as data collection methods, publication date, types of drugs, race, gender, source of data, and sample size, are taken into account, their significance levels are all statistically significant. However, according to Cohen's (1981) estimate of small, medium, and large effect size, each of their effect sizes is small except publication date from 1993 to 1994 ($\underline{Z}$ fisher = -0.2768, $\underline{D}$ cohen = -0.5608) and male gender ($\underline{Z}$ fisher = 0.2539, $\underline{D}$ cohen = 0.5133), which have medium effect sizes.

Research Hypothesis Two

In Table 2 of family structure, with k = 120 hypothesis tests, the combination of significance levels of Z for the family structure was statistically significant ($\underline{Z}$ = -10.839, $\underline{\rho}$

< 0.01). The mean of the weighted effect size (Zfisher) was 0.0193 corresponding to an R^2 = 0.0003 and D cohen = 0.0386, indicating less than a small effect size. Research Question (2a) was confirmed by the expected direction of the effect size (0.0193) indicating that the ineffective family structure has a positive relationship to adolescent drug use. All of the variables of family structure were predictive of adolescent drug use, such as socioeconomic status (Z = 6.963, p < 0.05), departing of family members (Z = -13.608, p < 0.05), family drug use (Z = 20.860, p < 0.05), and single-parent household (Z = 2.034, p < 0.05). However, an unexpected direction of effect sizes was found in socioeconomic status (Z fisher = -0.0393) and its subvariables of family income (Z fisher = -0.0401) and parents' education (Z fisher = -0.0391). That is, adolescents with parents with a high socioeconomic status including parents' high education or high family income have a statistically significantly higher risk to become drug users than adolescents who have parents with a low socioeconomic status. However, departing of family members, family drug use including parental drug use and sibling drug use, and single parent all had effect sizes in the expected directions (0.0630 for departing of family members; 0.1042 for parental drug use; 0.2583 for sibling drug use; 0.0594 for single parent). That is, a parent's death or one or both parents not living at home with the adolescent, parental drug use, sibling drug use, and single-parent household were all statistically significantly related to the adolescent drug use. Only the effect size of sibling drug use (Z fisher = 0.2583, D cohen = 0.5224) was of medium magnitude; the rest of parents' education (Z fisher = -0.0391, D cohen = -0.0783), family income (Z fisher = -0.0401, D cohen = -0.0802), departing of family members (Z fisher = 0.0630, D cohen = 0.1262), parental drug use (Z fisher = 0.1042, D cohen = 0.2088), and single parent (Z fisher = 0.0594, D cohen = 0.1189) were small effects.

Table2 The Effect Size of Family Variables in Family Structure

Family Variables	REF	DE	k	Z	Zfisher	R^2	Dcohen	95%CI	Nfs	χ^2 Qb	χ^2 Qw
Family Structure		+	120	-10.839*	0.0193	0.0003	0.0386	-0.215/+0.292	7927		1553.52*
Socioeconomic status	-0.063 to	-	42	6.963*	-0.0393	0.0015	-0.0785	-0.506/+0.350	15	15.38*	
family income	0.484	-	6	-4.782*	-0.0401	0.0016	-0.0802	-1.206/+1.058	14		29.35*
parent(s)'	-0.129 to	-	36	-7.491*	-0.0391	0.0015	-0.0783	-0.540/+0.385	94		304.66*

education	0.459										
Departing of family members	0.017 to 0.134	+	11	-13.608*	0.0630	0.0039	0.1262	-0.715/+0.958	280		252.73*
Family drug use											
parent(s) drug use	0.000 to 0.499	+	60	20.860*	0.1128	0.0126	0.2261	-0.134/+0.584	14235	19.30*	
		+	52	19.545*	0.1042	0.0107	0.2088	-0.178/+0.593	9281		335.42*
sibling drug use	0.161 to 0.412	+	8	12.059*	0.2583	0.0638	0.5224	-0.501/+1.489	518		10.11
Single parent	0.006 to 0.189	+	7	2.034*	0.0594	0.0035	0.1189	-0.937/+1.160	3		43.94*

Note: * ρ < .05; REF = range of the effect size (Zfisher); DE = direction of effect; "+" indicates expected direction of effect; "-" indicates unexpected direction of effect; unexpected direction of effect indicates that a directional pattern of the relationship between adolescent drug use and family variables in a hypothesis test disconfirms the directional pattern of such a relationship in a research hypothesis; expected direction of effect indicates that the directional pattern in a hypothesis test confirms the directional pattern in a research hypothesis; k = number of hypothesis test; Zfisher = mean of weighted effect size (weighted by sample size); R^2 = the square of correlation coefficient between adolescent drug use and family environment; Dcohen = mean Cohen's d (effect size); 95%CI = 95% confident interval for Dcohen; Nfs = fail-safe number; χ^2 = chi-square = homogeneity statistic test (Qw = within-group, Qb = between-group).

According to the standard of 5k+10 suggested by Rosenthal (1984; Rosenthal & Hall, 1981), the fail-safe numbers of family income, parents' education, and single parent all did not exceed this benchmark and can therefore be attributed to sampling bias.

For family relations in Table 3, with k = 61 hypothesis tests, the combination of significance levels of Z were statistically significant ($\underline{Z}$ = 14.749, $\underline{\rho}$ < 0.01). The mean of weighted effect size (Zfisher) was -0.0081, which corresponds to $\underline{R}^2$ = 0.00006 and $\underline{D}$ cohen = -0.0162, indicating a small effect. Only the relationship between authoritarian family and adolescent drug use was found to be statistically nonsignificant. That is, parents' control through guilt, punishment, and strict/harsh rules was not statistically significantly related to adolescent drug use. Democratic family, permissive family, positive affectivity, and negative affectivity were all found to be statistically significantly related to adolescent drug use ($\underline{Z}$ = 4.121, $\underline{Z}$ = 4.428, $\underline{Z}$ = 15.729, and $\underline{Z}$ = 9.930, respectively). However, democratic family had a small effect in the unexpected direction ($\underline{Z}$ fisher = -0.1617). That is, parents' well-established rules, encouraging children to express and discuss family issues openly, and

parents' reasoning favored adolescent drug use. This finding is somewhat different from the accepted view that a democratic family would be associated with a decrease in adolescent drug use. This surprising finding in the democratic family results from synthesizing these four articles: (1) the study by Block et al. (1988), which includes four positive correlations between adolescent drug use and parents' open communication with their children and parents' reasoning about their children's misbehavior ($\underline{r}$ = 0.26, reasoning [marijuana]; $\underline{r}$ = 0.35, reasoning [hard drug]; $\underline{r}$ =0.36, communication [marijuana]; $\underline{r}$ = 0.20, communication [hard drug]) and two negative correlations between adolescent drug use and parents' well-established rules ($\underline{r}$ = -0.33 [marijuana]; $\underline{r}$ = -0.04 [hard drug]); (2) the article by Brook,Whiteman, Gordon (1981), which includes one negative correlation between adolescent drug use and parents' encouraging their children's ideas ($\underline{r}$ = -0.27); (3) the article by Anderson and Henry (1994), which includes one negative correlation between adolescent drug use and parents' open communication with their children ($\underline{r}$ = -0.27); and (4) the article by Brook, Whiteman, Gordon, and Cohen(1986), which includes one negative correlation between adolescent drug use and parents' open communication with their children ($\underline{r}$ = -0.05) and one positive correlation between adolescent drug use and parents' encouraging their children's ideas ($\underline{r}$ = 0.03). From this data, it is clear that the findings of Block et al., (1988) substantially contribute to the positive relationship between democratic family style and adolescent drug use in this study.

Table3 The Effect Size of Family Variables in Family Relations

Family Variables	REF	DE	k	Z	Zfisher	R^2	Dcohen	95%CI	Nfs	χ^2 Qb	χ^2 Qw
Family Relations		-	61	14.749*	-0.0081	0.00006	-0.0162	-0.371/+0.339	5823		442.57*
Parental style											
democratic family	-0.03 to -0.377	+	28	1.658*	0.0209	0.0004	0.0418	-0.483/+0.565	154		
authoritarian family	-0.007 to 1.146	-	10	4.121*	-0.1617	0.0257	-0.3249	-1.930/+0.571	7	7.34*	59.14*
permissive family	0.100 to 0.413	+	14	0.0236	0.0290	0.0008	0.0580	-0.685/+0.797	39		31.47*
		+	4	4.428*	0.1318	0.0171	0.2644	-1.161/+1.620	16		17.64*
Affectivity		-	33	17.294*	-0.0251	0.0006	-0.0503	-0.532/+0.433	3959	5.09*	
positive affectivity	-0.321 to 0.761	-	23	15.729*	-0.1101	0.0120	0.2206	-0.363/+0.796	1958		207.36*
		+	10	9.930*	0.1747	0.0299	0.3512	-0.546/+1.219	338		35.53*

negative affectivity	-0.110 to 0.872

Note: *$p < .05$; REF = range of the effect size (Zfisher); DE = direction of the effect size (Zfisher); "+" indicates expected direction of effect size; "-" indicates unexpected direction of effect size; unexpected direction of effect indicates that a directional pattern of the relationship between adolescent drug use and family variables in a hypothesis test disconfirms the directional pattern of such a relationship in a research hypothesis; expected direction of effect indicates that the directional pattern in a hypothesis test confirms the directional pattern in a research hypothesis; k = number of hypothesis test; Zfisher = mean of weighted effect size (weighted by sample size); R^2 = the square of correlation coefficient between adolescent drug use and family environment; Dcohen = mean Cohen's d (effect size); 95%CI = 95% confident interval for Dcohen; Nfs = fail-safe number; χ^2 = chi-square = homogeneity statistic test (Qw = within-group, Qb = between-group).

The mean of the weighted effect size for permissive family was 0.1318, in the expected direction, which, corresponding to $\underline{R}^2 = 0.017$ and $\underline{D}$ cohen = 0.264, was a small effect. That is, the parents who did not make well-established rules and ensure that their children followed these rules were more likely to have children who became drug users.

Both positive and negative affectivity have small effects in the expected direction (positive affectivity, $\underline{Z}$ fisher = 0.1101; negative affectivity, $\underline{Z}$ fisher = 0.1747). That is, positive affectivity, adolescents' feeling of love, warmth, affection or support in the family, are associated with increased the resistance of adolescent drug use. In contrast, negative affectivity, adolescents' feeling of detachment, dissatisfaction, disappointment, or anger in the family, are associated with increased risk of adolescent drug use. The Nfs of democratic family (Nfs = 7) and permissive family (Nfs = 16) are less than 60 (e.g., 5k + 10 = 60, for democratic family) and 30 (e.g., 5k + 10 = 30, for permissive family), respectively; therefore, these results may be due to sampling bias. That is, it may be relatively easy to find statistically nonsignificant results for democratic family and permissive family in future studies, although both democratic family and permissive family are statistically significant in this study.

Research Hypothesis Three

Table 4 shows that significance levels and effect sizes are predictable by the characteristics of the primary study, such as data collection methods, publication date, types of drugs, race, sample size, source of data, and gender. Among these characteristics of the primary study and background characteristics, one moderator, data collection methods, was

not statistically significant for either significance level ($\underline{Z} = 1.610, \underline{\rho} > 0.05$) or effect sizes ($\underline{Z} = 1.437, \underline{\rho} > 0.05$). Two moderators, publication date ($\underline{Z} = 0.8431, \underline{\rho} > 0.05$) and types of drugs ($\underline{Z} = 0.6124, \underline{\rho} > 0.05$), did not have statistically significant effect sizes. The moderator of race had a large effect ($\underline{R} = 0.5350, \underline{\rho} < 0.05$).

Table4 Focused Comparison: Significance Levels and Effect Sizes by Characteristics of Primary Study and Background

Characteristics of Primary Study	Significant Levels Z	Effect Sizes Z	R
Data collection methods	1.610	1.437	0.0623
Publication date	4.436*	0.8431	-0.0247
Types of drugs	6.232*	0.6124	-0.0318
Race	8.077*	5.184*	0.5350
Sample size	12.555*	6.675*	-0.3776
Source of data	2.986*	5.207*	-0.2600
Gender	3.304*	5.132*	-0.1795

Note: * $\underline{\rho} < .05$; R = correlation between Fisher's Z (the strength between adolescent drug use and family environment) and the characteristics of the primary study

Before the prediction of effect size was analyzed, authoritarian family was excluded because of its nonsignificant relationship to adolescent drug use (see Table 3). Within the rest of the family variables, the results of the correlation between effect sizes and publication year for family/sibling drug use ($\underline{Z} = 0.9120, \underline{\rho} > 0.05$) and for socioeconomic status/family income ($\underline{Z} = 1.214, \underline{\rho} > 0.05$) were statistically nonsignificant (see Table 5); that is, 8 hypothesis tests of sibling drug use and 6 hypothesis tests of family income did not yield more statistically significant results and stronger effects in more recent studies. In contrast, parental drug use ($\underline{Z} = 3.586$), single parent ($\underline{Z} = 2.181$), departing of family members ($\underline{Z} = 9.750$), parents' education ($\underline{Z} = 3.037$), democratic family ($\underline{Z} = 2.671$), permissive family ($\underline{Z} = 2.925$), negative affectivity ($\underline{Z} = 3.033$), and positive affectivity ($\underline{Z} = 2.765$) were all statistically significant; that is, the hypothesis tests in each of the eight variables did yield more statistically significant results and stronger effects in more recent studies.

Table5 Prediction Between Publication Year and Family Variables

Variable	k	Z	Czfisher	Ccohen'sD	Regression Equation
FDUP	52	3.586*	0.3835	0.3825	Zfisher = -19.793 + (1.007E-02) • PUBYEAR Cohen's D = -40.650 + (2.067E-02) • PUBYEAR

FDUS	8	0.9120	0.4182	0.4133	
SPI	7	2.181*	0.4980	0.5076	Zfisher = -16.426 + (8.330E-03) • PUBYEAR Cohen's D = -37.334 + (1.891E-02) • PUBYEAR
DFM	11	9.750*	0.4095	-0.6821	Zfisher = -11.755 + (5.967E-03) • PUBYEAR Cohen's D = 86.315 + (-4.358EE-02) • PUBYEAR
SOEE	36	3.037*	-0.0279	-0.0297	Zfisher = 1.193 + (-6.153E-04) • PUBYEAR Cohen's D = 2.786 + (-1.389E-03) • PUBYEAR
SOEI	6	1.214	0.4611	0.4507	
PSD	10	2.671*	-0.1742	-0.0575	Zfisher = 14.663 + (-7.489E-03) • PUBYEAR Cohen's D = 19.789 + (-9.983E-03) • PUBYEAR
PSP	4	2.925*	-0.5577	-0.0667	Zfisher = 46.829 + (-2.352E-02) • PUBYEAR Cohen's D = 17.430 + (-8.649E-03) • PUBYEAR
AFFN	10	3.033*	-0.5059	-0.7223	Zfisher = 156.843 + (-7.876E-02) • PUBYEAR Cohen's D = 451.679 + (-0.227) • PUBYEAR
AFFP	23	2.765*	0.2445	0.2446	Zfisher = -23.343 + (1.187E-02) • PUBYEAR Cohen's D = -45.902 + (0.0234) • PUBYEAR

Note: * ρ < .01; FDUP = parental drug use; FDUS = sibling drug use; SPI = single parent; DFM = departing of family members; SOEE = parents' education; SOEI = family income; PSD = democratic family; PSP = permissive family; AFFN = negative affectivity; AFFP = positive affectivity; $C_{zfisher}$ = correlation coefficient between Zfisher and publication year; $C_{cohen'sD}$ = correlation coefficient between Cohen's D and publication year. PUBYEAR = publication year.

Summary

The findings of this study are presented as follows:

1. Based on the overall effect estimate for each of the family environment factors, family relations, and family structure, it was found that dysfunctional family environment, ineffective family structure, and dysfunctional family relations were all statistically significantly associated with adolescent drug use.

2. For family structure, a high socioeconomic status including family income and parents' education, one or both parents not living at home with the adolescent or parental death, family drug use including parental and sibling drug use, and living with a single parent significantly increased the opportunity for the adolescent to use drugs. Only the influence of sibling drug use had a medium effect on adolescent drug use; the rest of the subvariables, family income, parents'education, departing of family members, parental drug use, and single parent, had a small effect. However, the Nfs of family income, parents'

education, and living with a single parent did not surpass the standard of 5k+10; therefore, the relationship of adolescent drug use with these variables could be due to sampling bias. The rest of the Nfs for family structure indicate that their results are very robust.

3. For family relations, parents' control through guilt, punishment, or strict rules (authoritarian family) was not significantly associated with adolescent drug use. Adolescents in permissive families where parents may not make well-established rules and may not make sure that their children follow these rules are likely to be drug users. Adolescents in democratic families, where parents reason with their children and may make well-established rules and discipline or encourage children to express and discuss openly, have more opportunities to use drugs. The more adolescents in a family with positive affectivity felt their parents' support, affection, love or warmth, the less likely they were to become drug users. On the contrary, the more adolescents in a family with negative affectivity felt detachment, dissatisfaction, disappointment, or anger, the more likely they were to become drug users. The influence of all the subvariables of family relations on adolescent drug use has a small magnitude of effect. However, the Nfs of democratic and permissive families did not exceed the standard of 5k+10; therefore, the relationship of adolescent drug use with these variables could be due to sampling bias.

4. The relationship between adolescent drug use and family variables was moderated by publication year for parental drug use, single-parent family, departing of family members, parents' education, democratic family, permissive family, negative affectivity, and positive affection. That is, the relationship between these variables and adolescent drug use is stronger and less likely to be due to chance in more recent studies.

5. The tests of within-group homogeneity were statistically significant for all variables except sibling drug use. Therefore, the mean of weighted effect size for most of the subvariables in family structure and family relations should be interpreted as *observed* effect size rather than as a single population effect parameter. In addition, the wide scope of the constructs, the huge sample size (N), and the large number of hypothesis tests (k) may all contribute to the formation of a large heterogeneity. This may be because many different primary articles that are not derived from the same population may have different research designs, a diversity of subjects' backgrounds, and an extensive variation of the types of drugs studied.

Discussion

In this study, adolescents in a family with a higher socioeconomic status were found to be at risk for substance use. This result challenges a view prevalent in social control theory that would predict that lower socioeconomic status would be related to increased problems with adolescent drug use because many lower class families may lack the motivation and skills needed to encourage a child into a conventional line of action and, as a result, fail to provide the "opportunity" needed for successful achievement (Miller, 1958; Kornhauser, 1978). However, this result may show support for strain theory because the adolescent in a family of higher socioeconomic status who feels the most pressure to succeed academically and who fears that he or she may not fulfill family expectations because he or she lacks efficient management technique to successfully cope with frustration may engage in the greatest amount of delinquency (Stinchcombe, 1964).

Consistent with previous research (Kaufman & Kaufmann, 1979), the results of living with a single parent or of the departing of family members showed a statistically significant relationship to adolescent drug use. These results display that a family crisis may develop through a family's experiencing a parent's death, divorce, or the separation of family members and stress each of the family members. Depending on the family members' overall coping capacity, a family crisis can facilitate a family environment for maladaptive behaviors by the children, and drug use is among possible maladaptive behaviors.

Social learning theory asserts that the decision to engage in deviant behavior is the result of differential "reinforcement." According to this theory, adolescents learn through interaction in which drug use is encouraged and rewarded by parental and sibling drug use. That is, the deviant behaviors of parent(s) and siblings provide reinforcement for adolescent delinquency as well as a model for imitation (Akers & Cochran, 1985). The findings of the relationship between adolescent drug use and family drug use show support for the social learning approach in which parental or sibling drug use leads to a significant increase in the level of reported adolescent drug use. Within family drug use, the correlation of sibling drug use and adolescent drug use is the greatest among the family variables.

While a permissive family and negative affectivity facilitate the chance of adolescent substance use, positive affectivity diminishes the possibility of adolescent drug use. These

findings are consistent with social control theory in which substance use is more likely when attachment to family/parents is low. However, the findings of parental style show somewhat surprisingly that adolescents in a democratic family are at high risk to become drug users, and no support is found for the expected effect of authoritarian parents on adolescent drug use. These findings are inconsistent with common sense and with the previous findings that authoritarian parenting style increases and democratic parenting style decreases the opportunity for adolescent deviant behavior. Although this surprising finding in the democratic family results from synthesizing four primary articles (Block et al., (1988), Brook et al., (1981), Anderson & Henry (1994), and Brook, Whiteman, Gordon, & Cohen (1986)), the surprising result of the positive relationship between democratic family and adolescent drug use may be attributed to the profound influence of the Block et al., (1988) study, which includes four positive correlations between adolescent drug use and parents' open communication with their children and parents' reasoning about their children's misbehavior and two negative correlations between adolescent drug use and parents' well-established rules. Furthermore, the sample size of Block et al., (1988) was only 105 adolescents including 54 girls and 51 boys. Within this sample, only girls were surveyed about whether their parents had a democratic parenting style. This unique situation may make it difficult to generalize about the results concerning democratic parenting style. Additionally, sampling bias could have produced these unexpected results.

However, when we consider the findings of "parental styles" and "affectivity" simultaneously, one idea may occur that may imply that it is not the different conditions of parental styles that influence adolescent drug use but the feelings of adolescents created by the process of different parental styles that may make an adolescent become a drug user or remain drug free. Presumably, it is in the feeling the adolescent attaches to the events (i. e., different parental styles) that the combination of parental styles and affectivity may be more appropriately explained by social control theory than by strain theory or social learning theory.

Elliott, Huizinga, and Ageton (1985) had tried to synthesize the perspectives of strain, social control, and social learning. They argued that adolescents have different socialization experiences, resulting in different degrees of "attachment" to conventional groups. The limited opportunities for achieving legitimate success induce "strain" on the individual, and

as a result the strength of the social "attachment" weakens. Nevertheless, at the same time they acknowledge that a social learning model would include all of the predictors used in the test of the integrated model. However, any theoretical integration runs the risk of doing

what Hirschi (1969) warns against: denying or ignoring crucial differences in each of theoretical key concepts and overemphasizing one or more of the theories in the interest of producing a harmonious model. Moreover, such a conceptual integration does not deal with differences in assumptions underlying the concepts (Akers & Cochran, 1985).

In sum, the basic premise of social control theory is that delinquency occurs when an individual's bond to society is weakened or broken (Hirschi, 1969); social learning theory assumes that delinquency occurs when there is an overflow defiance against the law, and this defiance is usually learned through interaction with siblings, parents, or peers (Matsueda, 1982). Strain theory assumes that delinquency is the result of pressures generated by a society that emphasizes success and in the meantime does not provide equal access to the means of achievement (Agnew, 1991). Each theory may prevail in one condition but may be flawed in other situations. Therefore, they are complementary rather than competing perspectives. In other words, theories selected to interpret the influence of family environment on adolescent drug use may depend on the kind of subjects and their conditions, the research designs, the selection of variables, the emphasis of the current study, and the interpretation of previous studies related to the similar current study.

Finally, in this study the statistical significance or nonsignificance across the relationship between adolescent drug use and family variables was examined by combining the Z of each primary study, but the effect size (Zfisher) indicating the magnitude or strength of the relation was not examined to demonstrate whether the magnitude/strength (Zfisher) of the relationship between adolescent drug use and family variables were statistically significant or not. That is, whether Zfisher in this study is statistically significant or not is unknown. It is possible that the statistical significance of the relationship between adolescent drug use and family variables may be associated with the nonsignificant strength/magnitude of their relations.

Limitations

There are several limitations of this method. Cook and Leviton (1980) indicated that one of the greatest difficulties is synthesizing a quantitative review of studies when the results of the selected primary studies are statistically significantly heterogeneous. Although one may claim that the effect sizes for heterogeneity are treated only as the *observed* effect sizes, not as an estimate of a single population effect parameter, the heterogeneity results of the study make the results difficult to generalize. However, the whole issue of the homogeneity/heterogeneity of results remains a difficult one in meta-analysis currently, and there is no common agreement on exactly what to do if the results of selected primary studies are significantly heterogeneous.

There are two limitations regarding the coding procedures. One is about the ability of the qualified corater who may have the statistical background but may lack knowledge of meta-analysis. This inexperience may increase the likelihood of making mistakes in coding procedures, hence, decrease the intercoder reliability. The second limitation of the coding procedure is that managing the diversity of results within a primary study remains a difficult process because the diverse, dependent results in a primary study may make the test of significance and the estimation of effect sizes problematic.

In this study, there is no differentiation among the different kinds of drugs, such as cocaine, heroin, alcohol, and marijuana. This was not done because it is not possible to separate the various drugs and test the relationship between adolescent drug use and family variables based on each of the separate drugs and (b) the purpose of this study is to gain a general, comprehensive view about adolescent drug use, not to relate the concept of adolescent drug use to a specified drug use such as cocaine or heroin. In addition, all of the subvariables have small effect sizes except sibling drug use. This exceptional result mayillustrate that sibling influence plays a more important role than the rest of the subvariables in family structure. However, in this study the influence of the rest of the subvariables in family structure on the result of sibling drug use was unknown. That is, it was unknown whether or not the moderate effect size for sibling drug use was also influenced by other family structure variables.

Finally, Rosenthal (1979) provided the equation of the fail-safe number for the file

drawer problem. Although the fail-safe number shows an exact numerical value, it does not really indicate how many unpublished studies remain in file drawers; in fact, it needs to be compared to the standard of 5k+10 suggested by Rosenthal (1984) to see whether or not the research results will be tolerant to future null results. In a word, the fail-safe number only indirectly indicates the threshold number of null results that are needed to overturn the meta-analytic findings.

Conclusion and Suggestion

First, it is obvious that the conditions of some significant variables in the family structure, such as parents' education, family income, departing of family members, and single-parent family, cannot possibly be changed or controlled immediately or dramatically. However, parents should not become the models of drug use in the family (i.e., parental drug use), and they should show their children their love, warmth, affection, and support in an acceptable way in order to reduce the chance of the adolescents becoming involved in drug use (i.e., positive affectivity).

Second, at first glance at the variables of (a) parental style, democratic family, authoritarian family, and permissive family and at (b) positive affectivity and negative affectivity, a general picture of "family interaction and atmosphere" will appear. "Family interaction and atmosphere" will be interpreted in a common sense way because family interaction represents the parental style and affectivity implies the family atmosphere during the time of family interaction.

However, the results of tests of significance are somewhat different: positive affectivity, negative affectivity, and permissive family are statistically significantly related to adolescent drug use, but authoritarian family is not, and democratic family is statistically significantly related to adolescent drug use, but in an unexpected direction. From this point of view, parents should pay more attention to what their children feel during the time of family interaction. These unusual results mean that the adolescent psychological mechanisms between the conditions of parental style and affectivity are worthy of being investigated in the future.

Third, if the Zfisher of sibling influence is larger than any other of the family variables,

one who wishes to reduce the risk of adolescent drug use may pay more attention in the future to how to prevent the sibling influence within the family. This suggestion is not saying that the other family variables with significance results may be ignored but that they signify different procedures of intention based on the study findings. This suggestion also gives us an insight into the remarkable nature of peer influence; after all, for the adolescent, the sibling is a kind of peer. In a word, according to this study, sibling (probably including peer) influence plays a more important role in the prevention of adolescent drug use than we thought before. However, since these results are correlational, one must be cautious in making any causal inferences about the affects of peer inference on adolescent drug use.

Fourth, within the data base of these 32 primary studies, each of the measurements used for drug nonabuser (nonfrequent user) or drug abuser (frequent user) was identified, collected, and used in this study. That is, the data on both (nonfrequent user and frequent user) were all collected into one group of adolescent drug use and were not separated into two groups for the study because (a)data collection of drug abuse among adolescents was insufficient and (b) the main goal of this study is to gain a comprehensive concept of adolescent drug use rather than of drug nonabuse or drug abuse among adolescents. However, it is yet to be determined if the relationship between family variables and drug nonabuse or drug abuse in adolescents would be similar to the research results of this study. Likewise, it would be beneficial to determine if Zfisher and Cohen's D (effect size) for sibling drug use in adolescent drug nonabuse or drug abuse would still be larger than the Zfisher of the other variables. These concerns can be interesting for future research in adolescent drug use.

Fifth, the most surprising finding in the study is that the children in a democratic family are apt to use drugs. This gives us to re-examine the credit of pursuing the democratic family of parental styles. For a long time, a democratic family is praised and promoted in the society of Taiwan. The teaching from the implication of this finding is that the parental style of democratic family is not valuable as it was before, at least, to the adolescent drug users.

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*studies included in the meta-analysis

APPENDIX

Formulas for the Transformation of Inferential Statistics into *rs*

for t, $r = \sqrt{t^2/(t^2 + df)}$

for F(1,df), $r = \sqrt{F/(F + df)}$

for chi-square = $\chi^2_{(1)}$, $r = \sqrt{\chi^2/N}$

for Z, $r = \sqrt{Z^2/N}$

Formulas for the Transformation of Inferential Statistics into Zs

for t, $Z = \sqrt{df\{\ln[1 + (t^2/df)]\}} \cdot \sqrt{1 - (1/2df)}$

for F(1,df), $Z = \sqrt{df\{\ln[1 + (F/df)]\}} \cdot \sqrt{1 - (1/2df)}$

for chi-square = $\chi^2_{(1)}$, $Z = \sqrt{\chi^2}$

for *r*, $t = r\sqrt{N-2}/\sqrt{1-r^2}$

then $Z = \sqrt{df\{\ln[1 + (t^2/df)]\}} \cdot \sqrt{1 - (1/2df)}$

Note: Logarithms are natural logarithms (i.e., $\log_e$ and not $\log_{10}$).

Formula for Converting *r* to ZFISHER or ZFISHER to *r*

ZFISHER = .5{ln[(1+*r*)/(1-*r*)]}

$r = \left(e^{2Zfisher} - 1\right)/\left(e^{2Zfisher} + 1\right)$

formula for the fail-safe number for the $p = .05$ level of significance

N*fs*(p=.05) = $\left(\sum Z_p/1.645\right)^2 - k$

Formula for the moderate effects

$$Z = \sum C_p Z_{FISHER_p} \Big/ \sqrt{\sum \frac{(c_p^{\,2})}{(N_p - 3)}}$$

Note:The statistical software of Advanced BASIC Meta-Analysis (Mullen, 1989) and DSTAT (Johnson, 1993) would be used for data analysis.

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The Impact of Family Factors on Adolescent Drug Use — A Meta-analytic Approach

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Abstract

Findings regarding the influence of family environment on adolescent drug use were as follows:

1.Regarding the findings of family structure, the opportunity for adolescent drug use was significantly increased by a high socioeconomic status family income and parents' education, one or both parents not living at home with the adolescent or parental death, family drug use including parents' and sibling drug use, and single parent. Only the influence of sibling drug use has a medium effect size on adolescent drug use; the rest of the variables have a small magnitude of influence.

2.Regarding the findings of family relations in an authoritarian family, the parents' control through guilt, punishment, or strict rules was not significantly associated with adolescent drug use. In a permissive family, their parents may not make well-established rules, but even if they do, they may not make sure that their children follow these rules, resulting in some adolescents becoming likely drug users. In a democratic family where parents reason with their children and may make well-established rules and discipline or encourage their children to express their opinions and discuss family events openly, adolescents are surprisingly likely to use drugs. This finding is somewhat different from the common-sense idea that the democratic parenting style would decrease the opportunity of adolescent drug use. The more adolescents felt their parents' support, affection, love or warmth (positive affectivity), the less likely they were to become drug-users.

In sum, sibling influence is the largest than any other of family variables. Hence, in the future, it is highly suggestible to decrease the sibling negative influence that means to reduce the risk of adolescent drug use.

Key words: effect size, authoritarian family, permissive family, democratic family