

## **Adolescent Fathers Who Are Incarcerated Juvenile Offenders: Explanatory Study of the Co-Occurrence of Two Problem Behaviors**

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*We identify explanatory risk variables associated with the co-occurrence of two problem behaviors: juvenile offending and adolescent fatherhood. Data were gathered from a 5-year prospective, longitudinal study of 531 incarcerated juvenile offenders as they transitioned from youth correction facilities back into the community. Of the total sample, 125 (28.3%) of the male participants reported fatherhood before their 20th birthday. Six risk variables were predictive of adolescent fatherhood in this sample: (a) gang member, (b) resided with non-biological parent as primary caretaker, (c) low SES, (d) child of parent with alcoholism, (e) low mother education, and (f) family member convicted of a felony. These variables were then placed in individual, family, and social domains. Cumulative probabilities identified family related variables as the primary domain contributing to the predictive multivariate model. These results provide support for the development of prevention and interventions strategies focused across multiple ecological contexts, focusing specifically on the family unit.*

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**KEY WORDS:** juvenile offenders; adolescent fatherhood; problem behaviors; risk factors; juvenile justice.

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Problem drinking and drug use, delinquent behavior, school failure, and frequent or early sexual activity are highly correlated adolescent problem behaviors (Donovan & Jessor, 1985; Dryfoos, 1990). Often these problem behaviors continue to be displayed past adolescence (Moffitt, 1993; Patterson, 1982). Our goal is to identify explanatory risk variables associated with the co-existence of two problem behaviors: juvenile offending and adolescent fatherhood. Immediate personal and social costs for the individual are linked with delinquency and young parenthood, and long range implications exist for the youth, the child, and mother that reach into adulthood.

The examination of the co-occurrence of adolescent fatherhood and juvenile offending merits study for four reasons. First, higher rates of adolescent fatherhood (28%) have been reported within juvenile offending populations (Bullis, Yovanoff, Havel, & Mueller, 2002) than the general population (4 to 7%) (Sonenstein, Pleck, & Ku, 1993). Second, juvenile offenders experience negative life outcomes associated with low educational attainment, poor employment outcomes, and continued involvement with the corrections system (Bullis et al, 2002). The added effect of fatherhood on long-term community adjustment has received little attention (Unruh, Bullis, & Yovanoff, 2003). Third, negative life outcomes for juvenile offenders who are fathers expand to include both the child and typically a teen mother. Teen parents are not financially prepared to support themselves or their children. Nearly 42% of women receive Aid to Families with Dependent Children (AFDC) and almost half of all mothers who are welfare recipients became mothers during their teen years (General Accounting Office, 1994). More than 80% of these mothers provide custodial care for their children with child support being paid by only 46% of non-custodial fathers (Sorensen, 1997). Fourth, recent child support enforcement policies necessitate the father's ability to support his non-custodial children. Young non-custodial fathers demonstrate lower earnings, and in turn, exhibit higher poverty rates compared with other young men (Lerman & Ooms, 1993; Pirog-Good & Good, 1995). Approximately 23% of all non-custodial fathers live in poverty; of these fathers, nearly one-quarter are incarcerated without the ability to pay child support. Even after release from custody, the employability outcomes of this population are poor limiting their ability to provide child support. (Sorensen & Zibman, 2000).

Limited research has examined variables associated with the co-occurrence of juvenile offending and adolescent fatherhood. Elster and Hendricks (1987) identified that adult offender fathers were more likely than offender non-fathers to be (a) a school dropout, (b) unmarried, (c) unemployed, and (d) substance abusers. They also are more likely to possess a history of school behavior problems and other pregnancy. An increase in frequency of delinquency has been reported the year following teenage fatherhood (Thornberry, Wei, Stouthamer-Loeber & VanDyke, 2000). In examining risk variables separately for delinquent and adolescent fathers, Stouthamer-Loeber and Wei (1998) reported that only a subset of risk

variables are associated with adolescent fatherhood from the total set associated with juvenile delinquency: (a) old for grade, (b) lack of guilt, (c) low academic achievement, (d) low organizational participation, (e) poor education of mother, (f) family on welfare, (g) African-American, (h) broken home, and (i) impoverished neighborhood.

An ecological model examining risk variables across individual, family, and social domains was used in this study (Bronfenbrenner, 1989). This model provides a method of organizing variables to ascertain the unique contribution of individual and social influences and a mechanism to examine possible interactions between various contexts (e.g., various family characteristics may be directly linked with variables associated with the social context of the individual) (Dishion, Capaldi, & Yoerger, 1999; Jessor, 1993).

We address two research questions in this paper: do explanatory risk variables for incarcerated adolescent fathers vary compared with incarcerated non-fathers? and, do patterns of explanatory risk variables between ecological domains of the individual, family, and social environment occur?

### **METHOD: TRACS STUDY**

This study was completed as part of the recently completed *TRACS* research project (*Transition Research on Adjudicated Youth in Community Settings*) a 5-year prospective, longitudinal examination of outcomes of 531 incarcerated juvenile offenders as they transitioned from the Oregon Youth Authority (OYA, Oregon's juvenile correctional system) back into the community (Bullis et al., 2002). Of this sample, 125 (28.3%) of the male population reported fatherhood before their 20th birthday and constituted the sub-sample for this study. The research procedures that were followed are summarized below including a brief description of the research methods used in the *TRACS* project. More detailed description of the *TRACS* project can be found elsewhere (Bullis et al., 2002).

#### **Design**

The *TRACS* project used a prospective longitudinal survey approach (Menhard, 1990). Participants were identified and recruited prior to leaving OYA and returning to their home communities. Data were gathered on the individuals prior to exit and then at 6-month intervals through computer assisted telephone interviews. Interviews focused on participants' employment, education, living status, receipt of social services, and social activities. Data collection continued for a period of 1 to 4 years after initial exit from the juvenile correctional system. This type of survey approach (a) increases the accuracy of data gathered through the interview approach because questions are asked in close proximity to when

the event occurs, and (b) allows for the relationships of particular variables to be examined across time.

### **Selection and Recruitment of Participants**

Retired or part-time staff from the participating facilities recruited participants residing within two juvenile correctional facilities and three corrections camps. Recruitment began during the spring of 1994 and concluded in December of 1998. At the two youth correctional facilities, residential units (cottages) were used as the sampling frame. These cottages were grouped according to gender (only one facility houses females), age, and type of antisocial behavior (e.g., sex offenders, violent offenders, or substance abusers are in separate cottages). One to three youth were sampled each month from each cottage based on their "expected" release date from the correctional system. As the camps were much smaller, all youth leaving those facilities were recruited for the project.

### **Data Collection Instruments and Procedures**

Prior characteristics of the youth at entry into the facility were used as the explanatory variables. These specific data were collected on each youth and included: (a) demographic form, (b) Social Skill rating form, (c) socioeconomic status (SES) form, and (d) initial youth interview. The demographic form included background information relevant to the conceptual model on project participants prior to incarceration. The social skill rating scale developed by Halpern, Doren, Benz, Davis, and Herr (1992) was selected for its use as an instrument for a prior transition study. This rating scale provides two scores: (a) a problem-solving and thinking skill score defined by four items on the scale, and (b) a total score. The SES form was derived from the Hollingshead (1975) Four Factor Socio-Status Index resulting in 5 categories associated with socioeconomic status.

Facility staff completed the demographic forms on each participant. A staff person familiar with the research participant completed the social skill rating inventory. A structured interview was conducted prior to exit from the facilities by a project interviewer. Interviewers were required to (a) complete an intensive 15-hour training program, and (b) achieve an agreement index of .95 (total number of items – total number of disagreements/total number of items) with a pre-developed interview, before administering interviews to participants. These interviews also included the SES form. The interview questions were clearly worded and the great majority of questions required selecting from a set series of objective responses alternatives. If necessary, the interviews were administered by project staff fluent in Spanish.

### Sample to Population Comparison

To ensure the *TRACS* sample was similar or different to the general OYA population, comparisons were completed on major demographic variables (e.g., age, sex, type of crime, ethnic minority status). The OYA population profile came from the total population of OYA from 1993–1998 (roughly the years in which the study was conducted). The *TRACS* sample consisted of 16.9% females, a higher percentage than the OYA population of 12.0% women; however, females purposely were oversampled. Compared to the OYA Population the *TRACS* sample also presented fewer minority participants (19.8% vs. 21.7%), slightly younger at first commitment (15.77 years of age vs. 16.06 years of age), a higher proportion of property offenders (46.3% vs. 34.2%), and a lower percentage of person offenders (42.6% vs. 49.4%).

### Subsample Characteristics

Males from the *TRACS* data set were used as the subsample for this study. Fathers represent 125 males (28.3%) with the remaining males ( $n = 317$ ) representing the non-father sample (71.7%). Fatherhood was defined as any youth reporting fatherhood through their 20th birthday during the 5-year study. The mean age of exit for fathers was several months older at 16.86 ( $SD = 1.17$ ) compared to the average age of exit for non-fathers of 16.54 ( $SD = 1.35$ ). A total of 148 children was reported by members of the subsample (19 fathers (15.2%) had 2 children and 2 fathers had 3 children). The child lived with their mother 86.7% of the time and additionally, these fathers reported only 9.6% ( $n = 12$ ) of the time father maintained custody.

### Variables

The outcome variable was fatherhood. Fatherhood was defined by a self-report from the youth of having one or more children at the time of the initial interview through the data collection to the day of their 20th birthday. Explanatory variables fell into three broad risk domains: (a) individual, (b) family, and (c) social.

Individual variables included: (a) type of crime (person, property, both), (b) highest grade completed (grades 1–6, 7–11, 12, G.E.D.), (c) special education disability (yes/no), (d) prior treatment for drug/alcohol abuse (yes/no), (e) diagnosed psychiatric disorder (DSM diagnosis)(yes/no) (f) attempted suicide (yes/no), (g) history of self abuse (yes/no), (h) history of running away from any living placement (yes/no), (i) previous placement in supervised living placement (i.e., before entry into OYA) (yes/no), (j) retained at least one grade in school (yes/no), (k) parole revocation (yes/no), (l) age at first adjudication, (m) number of times adjudicated, (n) known or suspected gang member (yes, no, suspected), (o) Personal Social

Behavior Rating score, and (p) Problem-Solving subscale score derived for the rating scale.

Family variables included: (a) living arrangement for majority of life (two parent, one parent, no parent (e.g., foster care, friends, other relatives), (b) child of a parent with alcoholism (yes/no), (c) family member convicted of a crime (yes/no), (d) parent convicted of a crime (yes/no), (e) sibling convicted of a crime (yes/no), and (h) adopted (yes/no).

Social variables included: (a) the participant's ethnic background (Caucasian, Native, African American, Asian, Hispanic), (b) SES (unskilled laborers, semi-skilled workers, skilled workers, medium business/minor professional, major business/professional), (c) setting of most crimes (urban, rural, both), and (d) mother's level of education (no high school diploma, high school diploma, some college/training, college graduate & beyond).

### Data Analyses

After calculating the descriptive statistics on each of the explanatory variables examined in the model, we calculated bivariate analyses between each of these variables with the outcome variable of adolescent fatherhood (0 = No, 1 = Yes). The null hypothesis for each comparison was tested at the .05 alpha level using the appropriate parametric (e.g., *t*-test) or non-parametric (e.g., chi-square) statistic.

We then used logistic regression to build a predictive model of explanatory risk variables for the binary outcome of adolescent fatherhood (Hosmer & Lemeshow, 2000). The goal of logistic regression is to find the most parsimonious model of a composite of predictor variables that best predicts a dichotomous outcome (in this case, fatherhood). This process also corrects for the numerous bivariate comparisons that may contribute to unknown Type 1 errors. This study was exploratory and the statistical process we followed is justified within the logistic regression model building process. This statistical tool allows for the estimated effect of each variable in the model for differences in the distributions and the association of other independent variables. Moreover, the regression coefficients for variables retained in the model can be converted to odds ratios. The further the odds ratio departs from "1.0" the greater the probability of the outcome variable occurring or not occurring. For example, odds ratios greater than one infer that the event is "*x* times" (e.g., 2.2 times) *more* likely to occur. On the inverse, if an odds ratio is less than 1.0 can be inferred that the event is "*x* times" (e.g.,  $1.0/.25 = 4.0$ ) *less* likely to occur. Cases were only used within the model if all data points for all variables were available. We followed four steps in this process (Hosmer & Lemeshow, 2000, pp. 91–99).

First, if any multiple categorical variables exhibited a zero cell frequency within a category, this variable was adjusted by collapsing the categories.

Additionally, in a multiple category variable, if one category demonstrated a moderate level of association, the variable was collapsed into a new dichotomous variable with the referent category as one category and all other categories collapsed into a second category. Reduced variables included: (a) mother's education, (b) living status, and (c) SES. Mother's education and socio-economic were dichotomized as low or high. For level of mother's education a high school diploma and below was coded as low educational attainment and above a high school diploma was coded as high. The five SES categories were dichotomized at semi-skilled labor and below as low SES and high SES was coded high included minor/major business persons and professionals. Living status was split into three separate variables and were tested within the full model. One category for each variable was chosen as the referent category and all other categories were collapsed into one category. The three separate variables were: (a) two parents as the referent group, (b) one parent as the referent group, and (c) all categories not including a biological parent as the referent group.

Second, we selected the variables from the bivariate comparisons to be included within the full model. Hosmer and Lemeshow (2000) suggest in this step a lenient  $p$ -level should be chosen to guide variable selection. Therefore, we adopted a  $p$  level of .25 to select explanatory variables from the bivariate analysis.

Third, we placed all variables identified in the previous step for statistical significance when considered as a group. Typically, only variables that exhibit a  $p$  level of .05 are retained in this step. Fourth, all theoretically relevant interactions were examined between the model variables. Interactions between variables were only included within the model if statistical significance ( $p \leq .05$ ) was demonstrated and the interaction was theoretically relevant to the total model.

To explore possible relationships between ecological contexts (e.g., individual, family, social) on the outcome variable of fatherhood, cumulative probability of the model's predictor variables were calculated. The difference between the contributions of various domains can be explored by sequentially differing the order of entry into the cumulative probability distribution of the model's variables. This process assists in examining contribution of each domain with no other variables from the model present and then sequentially adding the probabilities of other domains.

First, the probabilities from the logistic regression coefficients from the final logistic regression model were calculated and then pooled into each of three ecological domains (i.e., individual, family, social). Second, the probabilities were then computed into cumulative probabilities by sequentially adding the probabilities of each explanatory factor from the final model. It is easiest to explain this cumulative probability calculation process at an individual level. For example, an individual from the sample who did not possess *any* of the explanatory model variables (e.g., not a gang member, etc.) would comprise the first cumulative probability of predicted fatherhood. The first cumulative probability would represent

a percentage of the predicted sample that would become adolescent fathers, but *not possess any of the explanatory variables* from the logistic regression model. Finally, the cumulative probability of participants who exhibit only one of the explanatory variables and no others would be calculated, and then individuals with two explanatory variables would be computed, and so on until the cumulative probability included individuals who possessed all predicted explanatory variables from the full model. The final cumulative probability explained the probability for persons who possessed *all* explanatory variables within the model.

The explanatory variables were then collapsed into their designated ecological domain (e.g., individual, family, or social context) to explore the probabilities of possessing these explanatory variables on predicting fatherhood from each ecological context. For example, by aggregating family context predictor variables (family member with felony conviction, alcoholic parent, and non-parent living status) and comparing this with the aggregated social context variables (low mother education and SES), the cumulative contribution of each ecological domain can be examined. The cumulative probabilities were examined by sequentially computing the probabilities in the following order: (a) family, (b) social, and (c) individual. This process assists in examining contribution of the family context with no other variables from the model present followed by the addition of the social context domain. Second, the cumulative probabilities were examined sequentially computing the contextual domains in the following order: (a) social, (b) family, and (c) individual.

We should note that the order of contribution to the cumulative probability for the outcome measure was only completed on the social context and family related domains. In viewing the results of the logistic regression model, the variable comprising individual characteristics consisted of a construct that included both individual characteristics but also variables associated with both family and social domains; consequently, the individual domain could not be explored clearly.

## RESULTS

Table I presents the bivariate analyses completed between fathers and non-fathers. Prior to completion of the model building process, a total of 225 (160 non-fathers and 65 fathers) cases were included in the analysis with 12 variables meeting the criterion for inclusion into the full model. Upon completion of the model building process, seven of 26 variables across the three ecological domains demonstrated statistical significance at the .05 alpha level. For the individual domain, gang membership and prior treatment for alcohol and drug abuse were statistically significant. Within the family domain, living arrangement, child of a parent with alcoholism, and family member convicted of a felony were statistically significant. In the social domain only SES met the criteria for statistical significance.

Table I. Bivariate Analysis of Explanatory Factors

Demographic characteristic	Fathers		Non-fathers		$X^2$ or $t$	df	p	Odds ratio (95% CI)
	n	%	n	%				
<i>Person-related variables</i>								
Age at exit interview								
Mean	16.86		16.54		2.30	425	.02	
Standard deviation	1.17		1.35					
Valid n	121		306					
Missing data	4	3.2	11	3.5				
Gang member								
No	74	60.2	239	79.7	22.66	2	.00	
Yes	44	35.8	45	15.0				
Suspected	5	4.1	16	5.3				
Valid n	123	100.0	300	100.0				
Missing data	2	1.6	17	5.4				
Txt. for drug/alcohol abuse								
No	31	25.0	108	36.0				
Yes	93	75.0	192	64.0	4.82	1	.03	1.69 (1.06, 2.70)
Valid n	124	100.0	300	100.0				
Missing data	1	0.8	17	5.4				
<i>Family-related variables</i>								
Living arrangement for majority of life								
Two parents	47	40.2	139	47.9				
Single parent	46	39.3	126	43.4	20.87	5	.00	
Foster/group home	9	7.7	13	4.5				
Other relatives	10	8.5	7	2.4				
Friends	4	3.4	0	0.0				
Institutional	1	0.9	5	1.7				
Valid n	117	100.0	290	100.0				
Missing data	8	6.4	27	8.5				
Children of parent with alcoholism								
No	50	42.7	178	60.1	10.27	1	.00	2.02 (1.31, 3.12)
Yes	67	57.3	118	39.9				
Valid n	117	100.0	296	100.0				
Missing data	8	6.4	21	6.6				
Family members convicted of crime								
No	38	35.5	132	49.8	6.28	1	.01	1.80 (1.13, 2.86)
Yes	69	64.5	133	50.2				
Valid n	107	100.0	265	100.0				
Missing data	18	14.4	52	16.4				
Siblings convicted of a crime								
No	29	43.9	71	59.7				
Yes	37	56.1	48	40.3	4.23	1	.04	1.89 (1.03, 3.47)
Valid n	66	100.0	119	100.0				
Missing data	59	47.2	198	62.5				
<i>Social-context related variables</i>								
Hollingshead SES categories								
Unskilled laborers	15	14.3	12	4.4				

Table I. Continued

Demographic characteristic	Fathers		Non-fathers		$X^2$ or $t$	$df$	$p$	Odds ratio (95% CI)
	$n$	%	$n$	%				
Semiskilled workers	28	26.7	52	19.0				
Skilled workers	15	14.3	53	19.3				
Medium bus/minor professional	11	10.5	31	11.3	16.14	4	.00	
Major bus/professional	36	34.3	126	46.0				
Valid $n$	105	100.0	274	100.0				
Missing data	20	16.0	43	13.6				

Note. To preserve space the following comparisons were completed but did not demonstrate statistical significance at the .05 alpha level and therefore were not included in the table in respect for space: Parole Previously Revoked, Criminal Charge in Past 3 years; Age at 1st Adjudication, Number of Time Adjudicated, Special Education Disability, DSM Diagnosis, Attempted Suicide, History of Self-Abuse, Previously Placed in Supervised Community Living Program, History of Running Away, Highest Grade Completed, Personal/Social Behavior Rating Scale, Problem Solving Subscale, Adopted, Parents Convicted of Crime, Mother’s Education level, Ethnicity, and Setting of Most Offenses.

The final logistical regression model ( $p = .00$ ) included the six variables presented in Table II. The odds ratios for this model ranged from 1.74 to 4.74. The first four variables demonstrate a statistical significance of at least the .05 alpha level. The last two variables approach statistical significance ( $p = .10$ ).

Table II. Fathers and Non-fathers: “Final” Model for Explanatory Variables for Logistic Regression Model

Variable with Coding Definition	$\beta$	$SE$	Odds ratio ( $Exp\beta$ ) 95% CI
Gang member (Gang member = 1; No gang affiliation or suspected = 0)	1.56***	.42	4.74 (2.07, 10.87)
Living situation most of life with caretaker other than parent(s) (Living with non-parents (e.g., foster care) = 1; 1 or both parents = 0)	1.24**	.53	3.45 (1.22, 9.80)
Low SES (Hollingshead categories 1, 2, 3 = 1; categories 4 & 5 = 0)	.70**	.34	2.02 (1.03, 3.93)
Child of parent with alcoholism (Parent with Alcoholism txt group = 1; else = 0)	.78**	.34	2.18 (1.12, 4.22)
Low mother education (H.S. diploma & below = 1; above H.S. diploma = 0)	.70*	.39	2.02 (.94, 4.34)
Family member convicted of a felony (Family member with conviction = 1; no conviction = 0)	.56*	.34	1.74 (.90, 3.39)
Constant	-2.80***	.46	0.06

Note.  $N = 225$ .  $-2$  Log Likelihood = 270.51922; Model  $\chi^2 = 42.066$ ;  $df = 6$  and  $p = .000$ . Dependent measure coded: Incarcerated male fathers by age 20 and below coded “1.” Incarcerated male non-fathers coded “0.”

\* $p \leq 0.10$ .  
 \*\* $p \leq 0.05$ .  
 \*\*\* $p \leq 0.01$ .

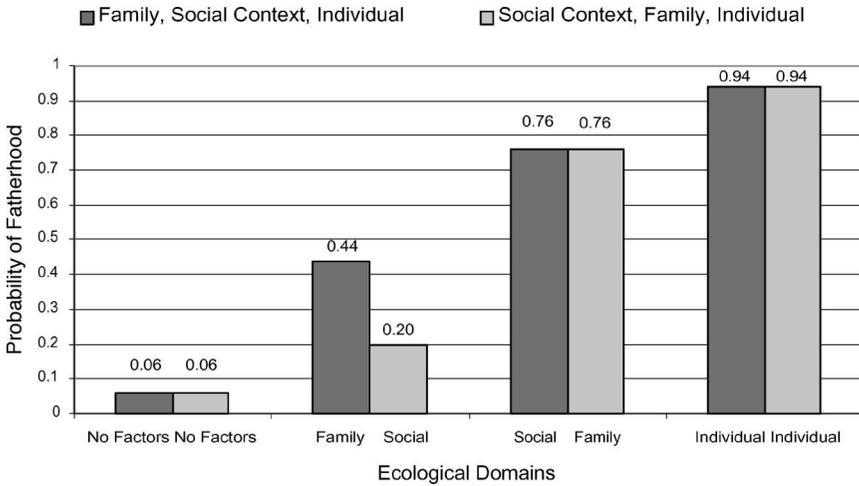


Fig. 1. Comparison of cumulative probability by order of ecological context entry.

These two variables were retained within the final model because they provided a suppressor effect of other model variables by increasing their regression coefficients (Pedhazur, 1997). The final model represented a statistical significant improvement over the null model with only the constant ( $-2 \log \text{likelihood} = 270.52; \chi^2 [df = 6] = 42.066, p = .00$ ). No interactions demonstrated statistical significance.

Figure 1 presents the cumulative probabilities for the outcome variable of fatherhood by each ecological domain's aggregated effects. The cumulative probability for each context consists of the combined probabilities for the variables from the prediction model associated with each domain. For example, the first dark bar presents the cumulative probability of individuals exhibiting no variables within the model (6%). The second dark shaded bar represents the cumulative probability of individuals possessing only family-related variables (e.g., family member convicted of a felony, parent with alcoholism, non-parent living status) (44%). The third dark shaded bar represents individuals experiencing both family and social context variables (e.g., low mother education, low SES) (76%). The last dark shaded bar includes individuals with variables associated with all three domains (94%), the total cumulative probability of fatherhood for this sample. The lighter shaded bars represent the sequential addition of domains in the following order: (a) no variables (6%), (b) social context (20%), (c) family related (76%), and (d) individual characteristics (94%). Therefore, this model predicts that male juvenile offenders who only possess family related explanatory variables are 44% more likely, or nearly two times more likely, to become adolescent fathers compared with individuals who possess only social context related variables. In

addition, persons with family related and social context predictors increase the probability of fatherhood by 32% to a cumulative probability of 76%. On the other hand, fatherhood is predictive at an increased rate of 56% (20% to 76%) when family related variables are added to individuals with only social context variables.

## DISCUSSION

Incarcerated adolescent fathers exhibited a more diverse range of risk variables than those of non-fathers. Our sample confirmed that incarcerated fathers possessed a set of risk variables as compared with incarcerated non-fathers. As importantly, risk variables spanned three ecological domains: individual, family, and social environment. In examining the individual predictor variables, gang membership was identified with the highest predictive value within the model. Gang membership included individuals who possess similar risk attributes aligned with other predictive variables of this study's explanatory model. For example, variables associated with gang membership include unstable family structure, delinquency, poverty, and alcohol and drug use (Esbensen & Huizinga, 1993; Hill, Howell, Hawkins, & Battin-Pearson, 1999). This result suggests that gang membership is predictive of adolescent fatherhood. Gang membership includes individuals who are associated with higher risk taking behaviors and possess family and social context variables also linked with adolescent fatherhood.

Family variables included being primarily raised by someone other than a biological parent (i.e., grandparent, foster care, residential treatment center) and being a child of a parent with alcoholism. In addition, possessing a family member convicted of a felony approached statistical significance at the .05 alpha level. These variables are contributors to unstable or disruptive living situations for youth and are linked to delinquency, drug use, and adolescent fatherhood (Thornberry, Smith, Rivera, Huizinga, & Stouthamer-Loeber, 1999). The inclusion of these three variables within the model suggests that family disruption is an influential factor associated with the co-morbidity of juvenile offending and adolescent fatherhood.

Two social variables, low mother's education and low socio-economic status, contributed to the explanatory model. Prior research has identified these two variables as contributing to individuals who are both adolescent fathers and delinquents (Stouthamer-Loeber et al., 1998). In addition, researchers also have defined these two variables as predicting delinquency or fatherhood individually when the other problem behavior is not present (e.g., delinquent and not a father, a father and not a delinquent) (Lipsey & Derzon, 1998, Stouthamer-Loeber et al., 1998).

The cumulative probability calculation predicted that a juvenile offender has a 20% probability of becoming a father if he resides within a neighborhood with variables associated with a low social context and exhibits no other variables within the model. On the other hand, a juvenile offender possessing only family-related

risks had a 44% probability of becoming a father. Moreover, if an individual possessed both disruptive family variables and neighborhood with poor social context variables the probability of fatherhood increased to 76% demonstrating the importance of family variables to the overall predicted probability of fatherhood. Disruptive family variables contributed to a higher probability for fatherhood if social variables were not negative (e.g., low SES; low mother education). Although if the social disorganization variables were present within the neighborhood and no negative family characteristics were present, a lower probability of fatherhood was predicted. This suggests that a stable family unit may be a protective factor reducing the negative influences of a socially disorganized neighborhood on an individual living there.

Implications for theory suggests that there is a distinct difference between the patterns of risk for juvenile offenders who are fathers compared with non-fathers supporting the premise that multi-problem individuals will exhibit more and more extreme risk factors (Jessor, 1977; Jessor & Jessor, 1993). Additionally, variables associated with these co-varying problem behaviors were present across all three ecological domains and contribute to the overall predictive model and supports further study of multi-problem behavior from this context. Examining the predictive model across ecological domains provides information for how various contexts of the individual contribute to the overall predictive model. Understanding these links can support the development of theory-based prevention and intervention strategies.

Overall, the co-occurrence of juvenile offending and adolescent fatherhood appear to be the result of a combination of variables associated with individual characteristics, family disruption, and social disorganization of the individual's environment. These results suggest that a distinct pattern of variables contribute to the co-occurrence of juvenile offenders and adolescent fathers. These variables also span the three ecological domains we examined (individual, family, and social) indicating a relationship between the social context and the family. The close link between family disruption factors may influence societal factors as to the economic status and neighborhood in which the youth lives. Family disruption may be influenced by these variables: (a) a parent with alcoholism, (b) parent who commits a felony and is in prison, or (c) low parental education levels may affect the type of employment. These factors often disrupt the economic status of a family and, accordingly, influence the neighborhood in which a family lives. Likewise, these types of family disruptions may also lead to the youth experiencing diverse living arrangements with individuals other than the biological parent.

It can not be assumed that the variables defined within this predictive model comprise all of the potential variables across ecological domains and that the variables we have identified can be used as a predictive assessment tool for defining this co-occurring problem behavior. However, these findings do provide a general understanding that a specific clustering of risks across ecological contexts are

evident for the co-occurrence of these problem behaviors. This study provides an initial baseline for future research to examine the patterns of risk factors across ecological domains to further understand the developmental process of juvenile offenders who are also fathers.

From an applied research perspective, these findings provide guidance for policy makers and practitioners in both prevention and intervention strategies. These findings emphasize the importance of multi-focused strategies addressing risks across ecological domains. Prior research indicates the early onset of antisocial behavior as a predictor for delinquency (Patterson, 1982; Walker, Steiber, & Bullis, 1997) with prevention strategies occurring prior or at initiation of the presence of risk factors, many of which may be manifested in early childhood. Based on the contribution of family related variables to the explanatory model, additional family supports for family units experiencing distress or disruption due to a felony conviction, parent with alcoholism, one or both parents not present, and other forms of family disruption need to be implemented. Communities demonstrating factors associated with higher levels of disorganization including gang membership, low SES, high incidence of family disruptions, and other community risk indicators need to focus on providing a multi-age prevention approach. Again, the findings suggest that the family be one of the targets of these preventions and intervention strategies. This approach can be both initiated within the schools, where in younger years the youth are present, but also within the social and economic culture of the community.

## REFERENCES

- Bronfenbrenner, U. (1989). Ecological systems theory. *Annals of Child Development*, 6, 187–249.
- Bullis, M., Yovanoff, P., Mueller, G., & Havel, E. (2002). Life on the “Ours”—Examination of the facility-to community transition of formerly incarcerated youth. *Exceptional Children*, 69, 7–22.
- Dishion, T. J., Capaldi, D. M., & Yoerger, K. (1999). Middle childhood antecedents to progressions in male adolescent substance use: An ecological analysis of risk and protection. *Journal of Adolescent Research*, 14, 175–205.
- Donovan, J. E., & Jessor, R. (1985). Structure of problem behavior in adolescence and young adulthood. *Journal of Consulting and Clinical Psychology*, 53, 890–904.
- Dryfoos, J. G. (1990). *Adolescents at risk*. New York: Oxford University Press.
- Elster, A. B., & Hendricks, L. (1986). Stresses and coping strategies of adolescent fathers. In A. B. Elster & M. E. Lamb (Eds.), *Adolescent fatherhood* (pp. 55–66). Hillsdale, NJ: Erlbaum.
- Esbensen, F. A., & Huizinga, D. (1993). Gangs, drugs, and delinquency in a survey of urban youth. *Criminology*, 31, 565–587.
- General Accounting Office. (1994). *Families on welfare: Teenage mothers least likely to become self-sufficient* (GAO/HEHS-94-115). Washington, DC: U.S. Government, General Accounting Office.
- Halpern, A., Doren, B., Benz, M., Davis, C., & Herr, C. (1992). *Teacher questionnaire: Students with disabilities*. Eugene, OR: Follow-Along Project, University of Oregon.
- Hill, K. G., Howell, J. C., Hawkins, J. D., & Battin-Pearson, S. R. (1999). Childhood risk factors for adolescent gang membership: Results from the Seattle Social Development Project. *Journal of Research in Crime and Delinquency*, 36, 300–322.
- Hollingshead, A. B. (1975). *Four factor index of social status*. New Haven, CT: Yale University, Department of Sociology.

- Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression* (2nd ed.). New York: Wiley.
- Jessor, R. (1993). Successful adolescent development among youth in high-risk settings. *American Psychologist, 48*, 117–126.
- Jessor, R., & Jessor, S. L. (1977). *Problem behavior and psychosocial development: A longitudinal study of youth*. New York: Academic Press.
- Lerman, R. I., & Ooms, T. J. (1993). Introduction: Evolution of unwed fatherhood as a policy issue. In R. I. Lerman & T. J. Ooms (Eds.), *Young unwed fathers* (pp. 1–26). Philadelphia: Temple University Press.
- Lipsey, M. W., & Derzon, J. H. (1998). Predictors of violent or serious delinquency in adolescence and early adulthood: A synthesis of longitudinal research. In R. Loeber & D. P. Farrington (Eds.), *Serious and violent juvenile offenders: Risk factors and successful interventions* (pp. 86–105). Thousand Oaks, CA: Sage.
- Menhard, S. (1990). *Longitudinal research*. Newbury Park, CA: Sage.
- Moffitt, T. E. (1993). “Life-course-persistent” and “adolescence-limited” antisocial behavior: A developmental taxonomy. *Psychological Review, 100*, 467–701.
- Patterson, G. R. (1982). *A social learning approach, Vol. 3: Coercive family process*. Eugene, OR: Castalia.
- Pedhazur, E. J. (1997). *Multiple regression in behavioral research: Explanation and prediction* (3rd ed.). Orlando, FL: Harcourt Brace & Company.
- Pirog-Good, M. A., & Good, D. H. (1995). Child support enforcement for teenage fathers: Problems and prospects. *Journal of Policy Analysis and Management, 14*, 25–42.
- Sonenstein, F. L., Pleck, J. H., & Ku, L. C. (1993). Paternity risk among adolescent males. In R. I. Lerman & T. J. Ooms (Eds.), *Young unwed fathers* (pp. 99–116). Philadelphia: Temple University Press.
- Sorensen, E. (1997). A national profile of nonresident fathers and their ability to pay child support. *Journal of Marriage and the Family, 59*, 785–797.
- Sorensen, E., & Zibman, C. (2000). *A look at poor dads who don't pay child support* (00–07). Washington, DC: Urban Institute.
- Stouthamer-Loeber, M., & Wei, E. (1998). The precursors of youth fatherhood and its effect on delinquency of teenage males. *Journal of Adolescent Health, 22*, 56–65.
- Thornberry, T. P., Smith, C. A., Rivera, C., Huizinga, D., & Stouthamer-Loeber, M. (1999). *Family disruption and delinquency*. Washington, DC: U.S. Department of Justice, Office of Juvenile Justice and Delinquency Prevention.
- Thornberry, T. P., Wei, E. H., Stouthamer-Loeber, M., & Van Dyke, J. (2000). *Teenage fatherhood and delinquent behavior*. Washington, DC: Office of Juvenile Justice and Delinquency Programs.
- Unruh, D., Bullis, M., & Yovanoff, P. (2003). Community reintegration outcomes for formerly incarcerated adolescent fathers compared with non-fathers. *Journal of Emotional and Behavior Disorders, 11*, 144–156.
- Walker, H. M., Steiber, S., & Bullis, M. (1997). Longitudinal correlates of arrest status among at-risk males. *Journal of Child and Family, 6*, 289–309.