

# **PREDICTING CONDUCT DISORDER, DRUG USE AND COURT INVOLVEMENT FOR EXPELLED ADOLESCENTS: DEVELOPING THEORETICALLY BASED EXPLANATORY MODELS BY GENDER**

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The purpose of this research study was to explore the interactive and unique predictive ability of general strain theory, social control theory and self-control theory on conduct disorder scores as measured by the BASC-2, illicit drug use and court involvement of a sample of expelled adolescents. In addition, this study examined the moderating role of gender with regard to the applicability of the three theories. A clinical and adaptive profile for 267 expelled adolescents was obtained through the collection of BASC-2 data from the students, teachers and parents/guardians. The results of this study indicate that the applicability of GST and SCT depend not only on the gender of the youth, but also on the type of deviant behavior being explained. However, no support for self-control theory was found regardless of the gender of the adolescent or the type of delinquency tested. The implications of these results are discussed along with a potential course of action for prevention and intervention.

*Keywords:* delinquency, gender, drug use, court involvement, mental health

## **INTRODUCTION**

Several theories attempting to explain deviant adolescent behavior have been proposed over the past several decades. Three predominant theories, which were the focus of our study, include social control theory (Hirschi, 1969), self-control theory (Gottfredson &

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Hirschi, 1990), and general strain theory (Agnew, 1992). In addition to these three theories, the role of gender was a primary factor of interest in our study given that significant gender differences in criminal behavior exist, and given the fact that the relationship between gender and adolescent delinquency appears to be changing with the gender gap closing over time. For example, Lauritsen, Heimer, & Lynch (2009) pointed out that violent crime by both males and females has declined from 1973 to 2005, but the decline has been greater for males. These authors indicated a need to further examine the role of gender with regard to delinquency. Furthermore, Church, Wharton, & Taylor (2009) concluded that “it is not only critical to recognize that there are distinct differences between male and female adolescents, but we must also know what those differences are, what they mean, and their importance in the treatment process” (p. 13).

Prior to the introduction of general strain theory, Robert Merton (1938) introduced the concept of strain theory, which purports that the reason people attain culturally prescribed goals through illegitimate venues is because they are denied the institutional means necessary to achieve those goals. However, after major criticisms of the theory, Agnew (1992) refined the theory and developed what is now known as general strain theory (GST). Agnew defined strain as “relationships in which others are not treating the individual as he or she would like to be treated” (p. 48) and he further explained that general strain theory is composed of three major types of strain. The first type of strain (e.g., classic strain theory) results from a failure to achieve positively valued goals. The second type of strain results from stressful life events. Finally, the third type of strain results from physical and/or emotional abuse at home or at school.

In addition to GST, social control theory (SCT) has been used for explaining delinquent behaviors through the process of weakened social bonds (Cheung & Cheung, 2008; Ozbay, & Ozcan 2006). According to Cheung & Cheung (2008), SCT can be described as a phenomenon that prohibits people from becoming deviant via the informal social control exerted by social bonds between the individual and his/her significant others. Therefore while GST focuses on the negative relationships that may cause delinquency, SCT focuses on the absence of significant relationships which would otherwise have served as a deterrent for delinquency (Agnew, 1992).

In 1990, Gottfredson and Hirschi expanded social control theory to include the concept of self-control. According to Gottfredson and Hirschi, a lack of commitment and a lack of attachment are significant components of self-control, and therefore social control and self-control are at least somewhat dependent. In fact, Gottfredson (2006) contends that the two major forms of control theory (social and self) are compatible and therefore are not competing explanations of delinquency. Low self-control is assumed to be related to crime in that those with low self-control are more likely to pursue immediate gratification. Self-control theory was of particular interest in our study given that those who lack self-control also tend to lack academic or other cognitive skills (Brownfield, 2010), and our study was based on a sample of youth who had already experienced school-related failure.

The explanatory value of SCT, GST and self-control theory has been tested empirically, although mostly through the use of non-experimental designs such as survey and questionnaire research. Given the nature of the independent variables (e.g., theorized causes), experimental designs are typically not feasible. Another limitation, which our study attempts to overcome, is the fact that the studies conducted to date have only tested one or two of the predominant theories. Furthermore, many of these studies have not examined the unique male versus female pathways to delinquency. Our paper discusses some of the more recent studies that have been conducted whereby SCT, GST and self-control theory have been tested empirically, and the limitations of these studies are identified in the hope that our study will be able to close some of the gaps in the literature.

The explanatory roles of SCT and self-control theory in delinquency were recently tested in a study conducted by Brownfield (2010) where he examined predictors of gang membership. Brownfield utilized survey data from a random sample of 618 Canadian high school students in a large metropolitan area. The results of his study indicate that certain aspects of SCT (indices of beliefs and commitment) were found to be significant predictors of gang membership, even after statistically controlling for self-control and peer delinquency. Therefore the results of Brownfield's study indicate that social control factors may play a critical and unique role in predicting delinquency. In addition, self-control was also found to be a unique contributor to delinquency. However, this study did not examine the potential moderating role of gender or account for the potential influence of GST factors.

In addition to the work conducted by Brownfield, Vazsonyi and Huang (2010) recently tested the explanatory value of self-control theory from a developmental perspective by following a cohort of 1,155 youth for six years, beginning at the age of 4.5 years. Vazsonyi and Huang found that there was a maturation effect on deviance in that deviance decreased over time, self-control was a stable factor over time, parenting was a predictor of self-control and a predictor of deviance over time, and self-control explained a significant amount of variance with regard to youth deviance. These findings are important because they imply that favorable parenting practices may at least partially mediate the relationship between self-control and delinquency. Although this study provided a unique perspective by examining the developmental aspects of parenting, self-control and deviance, it did not examine the potential moderating role of gender. Furthermore, the potential mediating effects of GST were not tested in this study. Therefore a need still exists to examine self-control in combination with GST for males and females separately.

Another recent study that examined the role of SCT on juvenile delinquency in the form of school suspensions and arrests was conducted by Kirk (2009). In his study, Kirk examined the unique and combined influence of three distinct types of social control including families, neighborhoods and schools. Using data from the 1997 Student Survey of Chicago Public Schools, Kirk conducted logistic regression mediation models to predict student suspension and found that a significant effect emerged with regard to parental supervision, student-teacher trust, and school collective efficacy. When predicting arrests, a significant effect emerged with regard to parental supervision and student-teacher trust. Therefore evidence of unique family and school-related effects were found when testing

the applicability of SCT on juvenile suspensions and arrests. However, Kirk's study was limited by the fact that learning-related individual characteristics (e.g., learning disabilities, learning problems, ADHD), were not considered, despite the fact that learning-related problems have been associated with negative school outcomes (Kita, Tanaka, Kikuchi, 2008; Lane, 1980). Moreover, the role of gender was not considered in the study.

In addition to the empirical support provided for SCT and self-control theory, researchers have found empirical support for GST, and in particular, family-based strain. For example, in a recent study conducted by Hollist, Hughes & Schaible (2009), adolescent maltreatment was found to be significantly associated with general delinquency, serious delinquency and substance abuse. The effects of family-based strain in the form of maltreatment persisted even after controlling for adolescent negative emotions, adolescent characteristics, and family characteristics such as level of supervision, income and marital status. Therefore this study was able to empirically verify the unique direct explanatory value of family-based strain with regard to delinquency. However, this study did not include social control factors or other types of strain. Furthermore, although this study included gender as a control variable, it did not focus on or examine specific gender differences in responses to family-based strain.

In an attempt to study the gender-delinquency relationship using family-related strain, Hay (2003) analyzed data from 182 urban adolescents that were obtained from self-administered questionnaires. The data collected attempted to measure family-based strain, negative emotions, and projected future delinquency. In addition, control variables were included such as age, parental education, race or ethnicity, past delinquency, parent monitoring-discipline and associations with delinquent peers. The results of a path analysis indicate that males were significantly associated with a higher level of family-based strain in the form of physical punishment, the effect of family-based strain on guilt was significantly different for males as compared to females with females having more guilt, and the positive effects of both strain and anger on delinquency were greater for males than females; although the difference in the two coefficients was only marginally significant. These results suggest that gender may be an important moderator that needs to be considered when applying theory to explain adolescent delinquency.

Although Hay's study found that males were significantly associated with a greater level of family-based strain due to physical punishment, a recent study found that females who were predominantly incarcerated for murder or arson were significantly more likely to have suffered from adverse childhood experiences (e.g., family-based strain) and to have poor mental health than were their male counterparts (Rossegger et al., 2010). This finding suggests that for females, the effect of family-based strain may be moderated by or interact with mental health when predicting criminal behavior. Therefore research that examines gender specific models based on GST in combination with SCT and psychological factors is still needed.

Since prior research has identified an indirect link between maltreatment and criminal behavior, it is also important to consider the indirect effect of maltreatment on delinquency, mediated by poor mental health outcomes. For example, researchers have found that youth who are exposed to adverse childhood experiences, such as maltreatment, neglect and/or dysfunction, tend to suffer from poor mental health outcomes (Afifi et al., 2008; Schilling, Aseltine, & Gore, 2007; Williams & Shutay, 2010). Consequently, the psycho-social impairment increases the likelihood of risk taking behaviors (Larkin, 2009), which may be due to poor decision making, ineffective coping mechanisms and/or the perceived need to self-medicate. Therefore the maltreatment may indirectly affect delinquency mediated by the adolescent's psychological profile. With that being said, the actual psychological profile of the youth should be examined in combination with varying aspects of strain, and the psychological measures should extend beyond negative emotions such as anger and depression. Finally, the moderating role of gender on the relationship between psychological factors and delinquency should be considered.

In addition to emotional-psychological factors, we believe that attention problems coupled with hyperactivity (e.g., ADHD) should be considered when predicting delinquency given that children with ADHD have impulse control problems (Richardson, 2000). For example, support for a link between ADHD and delinquency was found by Young and Gudjonsson (2006) in a study where they examined the effect of ADHD on several outcomes including socialization, anxiety, depression, and antisocial behavior. Specifically, the authors studied and compared three groups of adults consisting of an ADHD group, a clinical control group without ADHD, and a normal control group. The researchers found that those in the ADHD group scored significantly lower in socialization than the other two groups; those in the ADHD group scored significantly higher in depression and anxiety than those in the normal control group and significantly more anxious than those in the clinical control group; and finally, those in the ADHD group reported significantly greater antisocial behavior than those in the normal control group and those in the clinical control group. Therefore ADHD as a specific form of self-control may need to be considered.

In addition to the work done by Young and Gudjonsson, Johnson and Kercher (2007) conducted a study on the relationship between ADHD, strain and criminal behavior using a purposive sample of undergraduate students from a public university in Texas. Their findings indicate that while strain significantly predicted crime, the presence of ADHD accounted for a significant unique amount of variance when predicting criminal behavior after controlling for gender, which was also a significant factor. The authors concluded that support was found for general strain theory, and that individuals with ADHD may have less effective coping mechanisms in which to deal with stress generated from strain. However, we believe that ADHD may serve as a proxy for self-control theory given the typical impulsivity of ADHD children.

Although the research conducted to date has offered much value in testing SCT, family-based strain, self-control, and gender in explaining or predicting delinquency, the contribution of all three theories in combination has not been fully explored. Therefore a need still exists to simultaneously examine the relationship between various types of strain,

social control factors, self-control and delinquency, while controlling for psychological factors. Furthermore, a need exists to examine the moderating role of gender with regard to the applicability of GST, SCT and self-control theory in explaining juvenile delinquency. The purpose of our study was to develop distinct theoretically based explanatory models, using GST, SCT and self-control theory, for expelled male and female adolescents with regard to various types of delinquency-related outcomes such as conduct disorder, illicit drug use and court involvement.

## METHOD

### *Participants*

This study is based on a sample of 267 adolescents who have been removed from the traditional public school system due to misconduct ranging from truancy to severe physical assault. The entire database contains 289 adolescents, but 22 were excluded due to missing data on one or more variable of interest. The adolescents in this study range in age from 11 to 18 years, with a mean age of 14.74 years. The grade levels represented in this study range from 6<sup>th</sup> to 12<sup>th</sup> grade, with the majority of students being at the high school level (56.7%). In addition, the majority of the sample is male (75.7%). With regard to drug use and court involvement, males and females were about equally as likely to have used drugs (52.3% vs. 50.7%), although males were more likely to have been involved in the court system (62.1% vs. 46.2%). A summary of the research sample by gender is provided in Table 1.

**Table 1.**  
**Demographic Summary of Research Sample by Gender**

| Source                     | Male  | Female |
|----------------------------|-------|--------|
| Percent White              | 67.5% | 75.4%  |
| Percent Hispanic           | 28.1% | 21.5%  |
| Percent other race         | 4.4%  | 3.1%   |
| Percent missing parent     | 51.7% | 64.6%  |
| Percent free/reduced lunch | 28.1% | 33.8%  |
| Drug use                   | 50.7% | 52.3%  |
| Court involvement          | 62.1% | 46.2%  |
| Mean age                   | 14.67 | 14.95  |

### *Instruments*

The BASC-2 is a commonly used assessment instrument for public school settings. The BASC-2 is typically used to measure the perceived behavioral and psychological functioning of children and young adults ranging in age from 2 to 25 (Reynolds & Kamphaus, 2004). The BASC-2 consists of five components, which may be used individually or in any combination. The five components include the Teacher Rating Scale, the Parent Rating Scale, the Self-Report, the Structured Developmental History, and the Student Observation

System. Our study utilizes data from the Teacher Rating Scale (TRS), the Parent Rating Scale (PRS) and the Self-Report (SRP).

#### *Procedures and Data Analysis*

The data used for our study were obtained from educational records of students in grades 6-12 with significant disciplinary problems during a single year and who were enrolled in an Illinois regional alternative program. The dataset was originally obtained by permission from the local education authority and used for conducting a former study (Williams, 2009), which provided the momentum for the current study. Linear regression models were used to predict conduct disorder scores and logistic regression models were used to predict illicit drug use and court involvement for male and female adolescents separately. Age served as a covariate, missing parent in the home served as a SCT variable; socioeconomic status served as a GST variable; self-reported social stress served as a GST variable; self-reported relationship with parent served as SCT variable; self-reported depression, anxiety and sense of inadequacy served as psychological variables; teacher reported learning problems served as a GST variable; teacher reported attention problems and hyperactivity were treated as self-control variables; and student attitude about school served as a SCT variable. A backward entry method was used for each regression analysis and thus the unique effect of each of the predictors could be evaluated while controlling for the impact of the remaining predictors.

## **RESULTS**

The means, standard deviations and correlation matrix for the BASC-2 scales for the female sample are presented in Table 2. The results indicate that females had relatively high mean scores with regard to attention problems (63.51) and conduct problems (81.11). The correlation results indicate that teacher reported learning problems, attention problems and hyperactivity were most strongly correlated, while social stress, anxiety, depression and sense of inadequacy were most strongly correlated with coefficients in the substantial to strong range.

**Table 2.**  
**Female Correlation Matrix, Means and Standard Deviations ( $n = 65$ )**

| Measure                    | 1      | 2      | 3      | 4       | 5      | 6       | 7      | 8       | 9       | 10      | M     | SD    |
|----------------------------|--------|--------|--------|---------|--------|---------|--------|---------|---------|---------|-------|-------|
| 1. Attention problems      | -      | 0.52** | 0.57** | 0.20    | 0.12   | 0.12    | -0.02  | -0.06   | 0.11    | 0.02    | 63.51 | 14.52 |
| 2. Hyperactivity           | 0.52** | -      | 0.54** | 0.09    | 0.09   | 0.03    | -0.11  | 0.00    | 0.12    | 0.14    | 56.95 | 10.34 |
| 3. Learning problems       | 0.57** | 0.54** | -      | 0.09    | -0.08  | 0.19    | 0.05   | 0.00    | 0.14    | -0.04   | 53.32 | 9.60  |
| 4. Conduct problems        | 0.20   | 0.09   | 0.09   | -       | 0.18   | 0.32*   | 0.21   | 0.33**  | 0.13    | -0.33** | 81.11 | 22.28 |
| 5. Attitude about school   | 0.12   | 0.09   | -0.08  | 0.18    | -      | 0.40**  | 0.31*  | 0.47**  | 0.59**  | -0.22   | 58.91 | 12.33 |
| 6. Social stress           | 0.12   | 0.03   | 0.19   | 0.32*   | 0.40** | -       | 0.63** | 0.70**  | 0.66**  | -0.43** | 53.85 | 11.19 |
| 7. Anxiety                 | -0.02  | -0.11  | 0.05   | 0.21    | 0.31*  | 0.63**  | -      | 0.57**  | 0.57**  | -0.28*  | 52.11 | 10.19 |
| 8. Depression              | -0.06  | 0.00   | 0.00   | 0.33**  | 0.47** | 0.70**  | 0.57** | -       | 0.69**  | -0.54** | 58.00 | 12.82 |
| 9. Inadequacy              | 0.11   | 0.12   | 0.14   | 0.13    | 0.59** | 0.66**  | 0.57** | 0.69**  | -       | -0.35** | 58.89 | 12.52 |
| 10. Relations with parents | 0.02   | 0.14   | -0.04  | -0.33** | -0.22  | -0.43** | -0.28* | -0.54** | -0.35** | -       | 38.18 | 12.71 |

\* $p < .05$ . \*\* $p < .01$ .

Table 3 provides the means, standard deviations, and correlation matrix for the BASC-2 scales for the male sample. The results indicate that males had relatively high mean scores with regard to attention problems, hyperactivity and conduct problems. The correlation results indicate that teacher reported learning problems, attention problems and hyperactivity were most strongly correlated, while social stress, anxiety, depression and sense of inadequacy were most strongly correlated with coefficients in the moderate to strong range.

Overall, the descriptive results presented in Tables 2 and 3 indicate that the clusters of relationships detected were similar for males and females. For example, the teacher reported learning problems, attention problems and hyperactivity scales were moderately to substantially correlated and the psychological and social stress variables were substantially to strongly correlated. These correlation coefficients provide an indirect source of validity for the instrumentation used in this study. The mean scores presented in Tables 2 and 3 highlight the fact that both male and female expelled students have elevated conduct disorder scores as reported by the parents or guardians. Finally, the correlation coefficients suggest that students with elevated conduct disorder scores are also slightly more likely to have elevated attention problem scores, although the bivariate relationship between conduct disorder and attention problems was small for both females ( $r = .20$ ) and males ( $r = .24$ ).

The next set of analyses address the main purpose of this study, which was to determine the explanatory ability of GST, SCT, and self-control theory with regard to conduct disorder, illicit drug use and court involvement after controlling for age and psychological factors. In addition, the purpose of this study was to determine if the emergent explanatory models were moderated by gender. The results from the regression models are presented next beginning with conduct disorder, then illicit drug use and finally court involvement.

**Table 3**  
**Male Correlation Matrix, Means and Standard Deviations ( $n = 202$ )**

| Measure                    | 1      | 2      | 3      | 4       | 5       | 6       | 7      | 8       | 9       | 10      | M     | SD    |
|----------------------------|--------|--------|--------|---------|---------|---------|--------|---------|---------|---------|-------|-------|
| 1. Attention problems      | -      | 0.39** | 0.49** | 0.24**  | 0.15*   | 0.05    | 0.01   | 0.10    | 0.13    | -0.17*  | 67.81 | 13.65 |
| 2. Hyperactivity           | 0.39** | -      | 0.36** | -0.04   | 0.08    | -0.04   | 0.05   | 0.01    | 0.04    | -0.02   | 62.15 | 11.19 |
| 3. Learning problems       | 0.49** | 0.36** | -      | 0.07    | 0.11    | 0.05    | 0.05   | 0.05    | 0.06    | -0.04   | 56.99 | 11.07 |
| 4. Conduct problems        | 0.24** | -0.04  | 0.07   | -       | 0.23**  | 0.19**  | 0.06   | 0.27**  | 0.19**  | -0.37** | 77.37 | 19.98 |
| 5. Attitude about school   | 0.15*  | 0.08   | 0.11   | 0.23**  | -       | 0.28**  | 0.14*  | 0.40**  | 0.46**  | -0.32** | 56.19 | 12.17 |
| 6. Social stress           | 0.05   | -0.04  | 0.05   | 0.19**  | 0.28**  | -       | 0.57** | 0.71**  | 0.50**  | -0.28** | 49.01 | 9.21  |
| 7. Anxiety                 | 0.01   | 0.05   | 0.05   | 0.06    | 0.14*   | 0.57**  | -      | 0.50**  | 0.55**  | -0.07   | 46.00 | 8.90  |
| 8. Depression              | 0.10   | 0.01   | 0.05   | 0.27**  | 0.40**  | 0.71**  | 0.50** | -       | 0.56**  | -0.48** | 51.41 | 9.69  |
| 9. Inadequacy              | 0.13   | 0.04   | 0.06   | 0.19**  | 0.46**  | 0.50**  | 0.55** | 0.56**  | -       | -0.30** | 54.13 | 10.72 |
| 10. Relations with parents | -0.17* | -0.02  | -0.04  | -0.37** | -0.32** | -0.28** | -0.07  | -0.48** | -0.30** | -       | 40.92 | 11.89 |

\* $p < .05$ . \*\* $p < .01$ .

*Conduct Disorder*

**Female model.** The results for the female model indicate that the final model included two predictors that explained 15.7% of the variance in conduct disorder scores, and the model was statistically significant,  $R = .40$ ,  $p = .005$ . The regression coefficient results in Table 4 indicate that depression scores were positively, moderately and statistically significantly associated with conduct disorder,  $b = .34$ ,  $p = .005$ , and attention problem scores were weakly and marginally significantly associated with conduct disorder,  $b = .22$ ,  $p = .061$ . Therefore higher depression scores and higher attention problem scores were uniquely associated with higher conduct disorder scores.

**Male model.** The results for the male model indicate that the final model included six predictors that explained 23.0% of the variance in conduct disorder scores, and the model was statistically significant,  $R = .48$ ,  $p < .001$ . The regression coefficient results in Table 4 indicate that having a missing parent in the home was associated with a higher conduct disorder score,  $b = .14$ ,  $p = .030$ ; higher socioeconomic status was associated with a higher conduct disorder score,  $b = -.15$ ,  $p = .020$ ; elevated attention problem scores were associated with a higher conduct disorder score,  $b = .23$ ,  $p = .001$ ; lower hyperactivity scores were associated with a higher conduct disorder score,  $b = -.15$ ,  $p = .035$ ; and lower relations with parent scores were associated with a higher conduct disorder score,  $b = -.26$ ,  $p < .001$ . Therefore having a missing parent in the home, an elevated attention problem score, an elevated depression score, higher socioeconomic status, lower hyperactivity and less favorable relations with parent(s) was associated with higher conduct disorder scores.

**Table 4.**  
**Conduct Disorder Final Multiple Regression Model by Gender: Regression Coefficients**

| Variable              | B     | SE    | $\beta$ | 95% Confidence Interval for Odds Ratio |              |
|-----------------------|-------|-------|---------|--|--------------|
|                       |       |       |         | <i>Upper</i>                           | <i>Lower</i> |
| Female model          |       |       |         |  |              |
| Attention problems    | 0.34  | 0.18  | 0.22    | -0.02                                  | 0.70         |
| Depression            | 0.59  | 0.20  | 0.34**  | 0.19                                   | 1.00         |
| (Constant)            | 24.97 | 17.09 |         |  |              |
| Male model            |       |       |         |  |              |
| Missing parent        | 5.58  | 2.56  | 0.14*   | 0.53                                   | 10.63        |
| Free/reduced lunch    | -6.67 | 2.85  | -0.15*  | -12.29                                 | -1.06        |
| Attention problems    | 0.34  | 0.10  | 0.23**  | 0.14                                   | 0.54         |
| Hyperactivity         | -0.26 | 0.12  | -0.15*  | -0.50                                  | -0.02        |
| Depression            | 0.25  | 0.15  | 0.12    | -0.04                                  | 0.54         |
| Relations with parent | -0.43 | 0.12  | -0.26** | -0.67                                  | -0.19        |
| (Constant)            | 74.07 | 14.12 |         | 46.22                                  | 101.91       |

\* $p < .05$ . \*\*  $p < .01$ .

#### *Illicit Drug Use*

**Female model.** The results for the female logistic regression model indicate that three predictors of illicit drug use remained in the model and the model was statistically significant,  $\chi^2(3, N = 65) = 9.04, p = .029$ . The model explained a modest amount of variability with Nagelkerke  $R^2 = .17$ . The odds ratios presented in Table 5 indicate that older females were marginally significantly associated with a greater likelihood of using illicit drugs, odds ratio = 1.44,  $p = .068$ ; females with a missing parent in the home were associated with a greater likelihood of using illicit drugs, odds ratio = 2.63,  $p = .090$ ; and females with elevated depression scores were associated with a greater likelihood of using illicit drugs, odds ratio = 1.04,  $p = .107$ . However, missing parent in the home and depression were not statistically significant predictors of illicit drug use.

**Male model.** The results for the male logistic regression model indicate that four predictors of illicit drug use remained in the model and the model was statistically significant,  $\chi^2(4, N = 202) = 35.60, p < .001$ . The model explained a moderate amount of variability with Nagelkerke  $R^2 = .20$ . The odds ratios presented in Table 5 indicate that older males were statistically significantly associated with a greater likelihood of using illicit drugs, odds ratio = 1.65,  $p < .001$ ; elevated attention problem scores were statistically significantly associated with a greater likelihood of using illicit drugs, odds ratio = 1.04,  $p = .006$ ; lower learning problem scores were statistically significantly associated with

a greater likelihood of using illicit drugs, odds ratio = 0.96,  $p = .030$ ; and higher attitude toward school scores were statistically significantly associated with a greater likelihood of using illicit drugs, odds ratio = 1.04,  $p = .009$ .

**Table 5.**  
**Illicit drug use Final Logistic Regression Model by Gender: Regression Coefficients**

| Variable               | B       | Wald test | Odds Ratio | 95% Confidence Interval for Odds Ratio |              |
|------------------------|---------|-----------|------------|--|--------------|
|                        |         |           |            | <i>Upper</i>                           | <i>Lower</i> |
| Female model           |         |           |            |  |              |
| Age                    | 0.37    | 3.33      | 1.44       | 0.97                                   | 2.142        |
| Missing parent         | 0.97    | 2.87      | 2.63       | 0.86                                   | 8.016        |
| Depression             | 0.03    | 2.59      | 1.04       | 0.99                                   | 1.079        |
| (Constant)             | -8.02*  | 5.65      | 0.00       |  |              |
| Male model             |         |           |            |  |              |
| Age                    | 0.50**  | 20.50     | 1.65       | 1.33                                   | 2.04         |
| Attention problems     | 0.04**  | 7.43      | 1.04       | 1.01                                   | 1.071        |
| Learning problems      | -0.04*  | 4.71      | 0.96       | 0.93                                   | 0.996        |
| Attitude toward school | 0.03**  | 6.80      | 1.04       | 1.01                                   | 1.062        |
| (Constant)             | -9.80** | 17.59     | 0.00       |  |              |

\* $p < .05$ . \*\*  $p < .01$ .

### *Court Involvement*

**Female model.** The results for the female logistic regression model indicate that six predictors of court involvement remained in the model and the model was statistically significant,  $\chi^2(6, N = 65) = 21.17, p = .002$ . The model explained a large amount of variability with Nagelkerke  $R^2 = .37$ . The odds ratios presented in Table 6 indicate that older females were marginally significantly associated with a greater likelihood of being involved in the court system, odds ratio = 1.58,  $p = .061$ ; females with elevated learning problem scores were associated, although not significantly, with a greater likelihood of being involved in the court system, odds ratio = 1.07,  $p = .138$ ; females with less favorable attitudes toward school were statistically significantly associated with a greater likelihood of being involved in the court system, odds ratio = 0.93,  $p = .024$ ; females with elevated social stress scores were associated, although not significantly, with a greater likelihood of being involved in the court system, odds ratio = 1.07,  $p = .107$ ; females with elevated anxiety scores were marginally significantly associated with a greater likelihood of being involved in the court system, odds ratio = 1.07,  $p = .091$ ; and females with a lower sense of inadequacy were marginally significantly associated with a greater likelihood of being involved in the court system, odds ratio = 0.93,  $p = .068$ .

**Male model.** The results for the male logistic regression model indicate that three predictors of court involvement remained and the model was statistically significant,  $\chi^2(3, N = 202) = 22.63, p < .001$ . The model explained a modest amount of variability with Nagelkerke  $R^2 = .14$ . The odds ratios presented in Table 6 indicate that older males were statistically significantly associated with a greater likelihood of being involved in the court system, odds ratio = 1.36,  $p = .003$ ; lower socioeconomic males were statistically significantly associated with a greater likelihood of being involved in the court system, odds ratio = 2.95,  $p = .004$ ; and males with elevated attention problem scores were statistically and significantly associated with a greater likelihood of being involved in the court system, odds ratio = 1.04,  $p = .008$ .

**Table 6.**  
**Court Involvement Final Logistic Regression Model by Gender: Regression Coefficients**

| Variable               | B       | Wald test | Odds Ratio | 95% Confidence Interval for Odds Ratio |       |
|------------------------|---------|-----------|------------|--|-------|
|                        |         |           |            | Upper                                  | Lower |
| Female model           |         |           |            |  |       |
| Age                    | 0.45    | 3.52      | 1.58       | 0.98                                   | 2.53  |
| Learning problems      | 0.07    | 2.20      | 1.07       | 0.98                                   | 1.16  |
| Attitude toward school | -0.07*  | 5.08      | 0.93       | 0.88                                   | 0.99  |
| Social stress          | 0.07    | 2.60      | 1.07       | 0.99                                   | 1.16  |
| Anxiety                | 0.07    | 2.86      | 1.07       | 0.99                                   | 1.17  |
| Sense of inadequacy    | -0.08   | 3.33      | 0.93       | 0.86                                   | 1.01  |
| (Constant)             | -9.13   | 3.26      | 0.00       |  |       |
| Male model             |         |           |            |  |       |
| Age                    | 0.31**  | 8.68      | 1.36       | 1.11                                   | 1.68  |
| Free/reduced lunch     | 1.08**  | 8.18      | 2.95       | 1.41                                   | 6.18  |
| Attention problems     | 0.03**  | 6.94      | 1.04       | 1.01                                   | 1.06  |
| (Constant)             | -6.61** | 10.19     | 0.00       |  |       |

\* $p < .05$ . \*\*  $p < .01$ .

### Conclusions

This study examined the explanatory power of GST, SCT and self-control theory with regard to conduct disorder, illicit drug use and court involvement of expelled male and female adolescents. The results of this study indicate that when predicting conduct disorder for females, attention problems and depression were predictors. For males, a miss-

ing parent in the home, socio-economic status, relations with parent, attention problems, hyperactivity and depression were predictors. However, for males the effect of socioeconomic status and hyperactivity ran counter to expectations given that males who were on free/reduced lunch and males who had higher hyperactivity scores were associated with lower conduct disorder scores.

The results for illicit drug use indicate that for females, missing parent in the home and depression were predictors. For male illicit drug use, attention problems, learning problems and attitude toward school were predictors. However, the opposite effect emerged for learning problems and attitude toward school given that males with higher learning problem scores were associated with a lower likelihood of using drugs, and males with more favorable attitudes toward school were associated with a greater likelihood of using drugs.

The results for female court involvement indicate that attitude toward school, learning problems, social stress, anxiety and sense of inadequacy were predictors. However, the relationship between sense of inadequacy and court involvement was negative, which ran counter to expectations. Finally, for male court involvement, socioeconomic status and attention problems were predictors.

## DISCUSSION

The results of this study indicate that the applicability of GST and SCT depend not only on the gender of the youth, but also on the type of deviant behavior being explained. However, no support for self-control theory was found regardless of the gender of the adolescent or the type of delinquency tested. However, it is not clear as to whether the effect of self-control on conduct disorder, illicit drug use, and court involvement is completely mediated by GST, SCT and psychological factors, or if ADHD is simply not an appropriate proxy to use for self-control.

### *Conduct Disorder*

For females, attention problems and depression were found to be predictors of conduct disorder scores as determined by a parent or guardian. These results suggest that attention problems alone (without the hyperactivity) may actually serve as an academic strain and not necessarily as a component of self-control. Furthermore, the effect of this strain on conduct disorder was present in the model even after statistically controlling for depression. Finally, depression was the strongest and only statistically significant predictor of conduct disorder after controlling for the other factors.

For males, similar effects for attention problems and depression were found, although the effect of depression was much smaller for males. Furthermore, missing parent in the home was associated with conduct disorder for males, which is possibly due to a lack of proper supervision as suggested by SCT. In addition, relation with parent was also a significant factor for males when predicting conduct disorder, which provides additional support for SCT and possibly GST. These results suggest that males who have a weakened

bond with their parent, who are more likely to lack supervision, and who are depressed are more likely to exhibit behavior that is consistent with conduct disorder.

Inconsistent with GST, our study found that male students on free or reduced lunch were associated with lower conduct disorder scores. However, it is possible that parent perceptions of conduct disorder are moderated by socioeconomic status. In fact, in follow-up analyses, we found that parents with male children on free or reduced lunch provided statistically significantly lower conduct disorder ratings of their children,  $t(201) = 2.68$ ,  $p = .008$ , when compared to parents of males who were not on free or reduced lunch (79.68 and 71.46, respectively) even though the two socioeconomic groups were not found to differ significantly on any of the other predictor variables,  $p > .05$ . We also found that when looking at teachers' ratings of conduct disorder for this same group of adolescents, the teachers rated the free/reduced lunch youth as statistically significantly higher on conduct disorder (62.56 and 56.45),  $t(200) = -2.48$ ,  $p = .014$ . These findings suggest that differences in parent perceptions or definitions of conduct disorder may be based on socioeconomic status and therefore future research in this area is strongly encouraged.

Another unexpected finding in our study was that lower hyperactivity was associated with higher conduct disorder for males. Therefore while attention problems were associated with conduct disorder, hyperactivity was not. In fact, those with higher attention problems and lower hyperactivity were associated with higher conduct disorder scores. This finding negates the hypothesis that youth with ADHD (combined attention problems and hyperactivity) are prone to conduct problems due to self-control issues. Instead, there seems to be something unique about having attention problems without the hyperactivity that relates more strongly to conduct disorder. Therefore future research is still needed in this area.

#### *Illicit Drug Use*

The illicit drug use findings for females are consistent with the literature in that depression is a major predictor of drug use. Our study also found that missing parent in the home explained a unique amount of variance relative to illicit drug use for females. Therefore, female illicit drug use can be at least partially explained by SCT. Also of interest was the finding that both males and females who had more favorable attitudes toward school were associated with a greater likelihood of using drugs. A possible interpretation of this finding is that the student's perception of his or her school environment may be at least partially mediated by his perception of his home environment. In fact in our study, there was a negative association between relations with parent and attitude toward school in that youth with more favorable attitudes about their relations with their parent were associated with less favorable attitudes towards school. This association may be due to the fact that adolescent drug use is more common in a dysfunctional and/or maltreating home (Dube et al., 2003; Kosterman, Hawkins, Catalano & Abbott, 2000; Larkin, 2009), and therefore those using drugs may have more positive attitudes towards school since their relations with their parent(s) are likely strained.

For male illicit drug use, in addition to attitude toward school, both learning problems and attention problems were significant predictors. We now believe that both learning problems and attention problems are strain-related factors, given that hyperactivity was not found to coincide with attention problems to predict delinquency. Therefore male illicit drug use was primarily explained by GST with attitude toward school emerging as a possible suppressor variable.

### *Court Involvement*

With regard to female court involvement, the significant predictive ability of attitude to school, learning problems, social stress, and anxiety is consistent with SCT and GST, and indicates that SCT, GST and psychological factors all offer unique explanatory power in predicting female court involvement. However, the finding that females with a lower sense of inadequacy were associated with a greater likelihood of being involved in the court system seems counterintuitive. However, a possible explanation for this finding is that female adolescents who do not feel inadequate blame the system for their inability to succeed (versus themselves) and therefore take it out on the system. This interpretation seems consistent with classical strain theory, which is one of the three types of general strains proposed by Agnew (1992).

With regard to male adolescents, our study found that soci-economic status was a significant predictor of court involvement, which is consistent with GST. Specifically, male adolescents who were on free or reduced lunch status were much more likely to have had contact with the criminal justice system. However, it is not clear as to whether economically disadvantaged males are committing more crimes or are simply more likely to be arrested and/or convicted than their more advantaged counterparts. Therefore future research should investigate this issue further by comparing arrest and conviction rates of youth from varying economic strata.

Another predictor of court involvement for males was the adolescent's attention problems score. However, greater hyperactivity was not found to be a significant predictor of court involvement for males. Therefore again, this finding suggests that attention problems for males may serve more as a strain variable (obstacle to achieving academic success) than a self-control variable. Specifically, youth with attention problems may have school-based strain that leads to delinquency. As O'Brien, Langhinrichsen-Rohling & Shelley-Tremblay (2007) concluded in their study of adjudicated adolescent males, there is a need for educational interventions coupled with psychological interventions for youth who are entering the juvenile justice system. We believe that this is true for both male and female adolescents.

In summary, our findings indicate that GST and psychological factors explained conduct disorder for both females and males, and SCT theory explained conduct disorder for males only. With regard to illicit drug use, SCT and psychological factors were predictors for females while GST was a predictor for males. For court involvement, SCT, GST and psychological factors were predictors for females while only GST was a predictor for

males. Therefore males and females were most different with regard to their predictors of illicit drug use.

#### *Recommendations for Intervention and Treatment*

Since we believe that impaired mental functioning is primarily due to maltreatment and/or a dysfunctional family, a possible recommendation for intervention is the use of Eye Movement Desensitization Reprocessing (EMDR). EMDR may be particularly useful if family member participation in the treatment process is not possible or recommended. According to the EMDR International Association, "EMDR is a phased, scientifically validated, and integrative psychotherapy approach based on the theory that much of psychopathology is due to traumatic experience or disturbing life events." These traumas result in the impairment of the individual's natural ability to process and integrate their experiences (<http://www.emdria.org>). Although the use of EMDR has been mostly evaluated with adult samples, recent research has shown that EMDR has promise to be an effective treatment for the adolescent population as well (Bronner, Beer, Van Eldik, Grootenhuis, & Last, 2009). Finally, EMDR has been found to result in highly favorable outcomes in as little as three to four sessions, and the favorable results are persistent (Shapiro & Forrest, 2004).

From an educational standpoint, a source of prevention and intervention for females may be having a strong bond with the school, where the school may serve as a sanctuary or a support system for girls with troubled homes. A source of prevention and intervention for both males and females is the quick identification of learning problems and attention problems as to avoid the phenomenon of school failure, which may serve as a source of strain impacting the behavior of the child. Furthermore, once such problems are identified, resources must be used immediately to remediate the problems, which may include individualized education plans, medication, and/or formal psychological counseling.

#### *Limitations*

This study has three major limitations which include (1) the relatively small sample size of females, (2) the reliance on reported data that were provided by teachers, parents/guardians, and adolescents with regard to the BASC-2 outcomes, and (3) the non-experimental research design due to the nature of the study. Although the use of self-reported data is always subject to response bias and validity concerns, it is important to note that the bivariate correlations between the BASC-2 scales included in this study yielded substantial to strong correlations between many of the scales (e.g., depression anxiety, sense of inadequacy, and social stress, etc.). Therefore the ratings supplied by the adolescents in our study appear to demonstrate convergent validity where appropriate. Furthermore, the theoretical foundation of this study helps to substantiate the validity of the findings. Finally, it is important to note that although this study is non-experimental in nature, the simultaneous inclusion of multiple explanatory and therefore rival factors in the statistical models helped to control for factors that could not have otherwise been controlled.

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