

## Differential Effects of Parents and Peers on Externalizing Behavior and Drug Use

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### Abstract

This study explored how peer deviant behavior and peer drug use differentially mediated the paths from unsupportive parenting to youth externalizing behavior and both the probability and extent of current drug use in a sample of Venezuelan youth. Models were further extended to test for group differences by gender and age. Results suggested that peer influences are domain specific among Venezuelan youth. That is, deviant peer behavior mediated the path from unsupportive parenting to youth externalizing behaviors, and peer drug use mediated the path to the drug use outcome. Mediation effects were partial, suggesting that parenting influenced the outcomes beyond its impact on affiliations with negative peers. Notable exceptions to the models were found when moderated by either gender or age. Implications for the development of screening tools and for formulating intervention programs targeting this age group are discussed.

**Keywords:** Peers, parenting, Venezuela, Drug use, Externalizing behavior

## Efectos Diferenciales de Padres y Pares sobre la Externalización de Conductas y Consumo de Drogas

### Resumen

Este estudio explora cómo la conducta anómica de los pares y el uso de drogas de los pares moderan diferencialmente las trayectorias de parentalidad desapegada hacia conductas externalizadas y cómo ambas moderan la probabilidad y alcance del consumo de sustancias en una muestra de jóvenes venezolanos. Los resultados sugieren que la influencia de los pares es sobre algunos dominios específicos entre los jóvenes. Esto es, conductas desviadas de los pares moderan el camino entre padres desapegados hacia las conductas de los jóvenes, y el consumo de drogas de los pares delinean la trayectoria hacia el consumo de sustancias. Los efectos mediadores fueron parciales, lo que sugiere que los padres influyen las consecuencias más allá del impacto sobre las afiliaciones con pares negativos. Se hallaron excepciones a los modelos cuando se controló por sexo y edad. Se discuten las implicaciones de desarrollar herramientas y programas de intervención para este grupo de edad.

**Palabras clave:** Padres, Crianza, Pares, Drogas, Consumo, Venezuela

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In the United States, a robust literature has demonstrated the linkages between parenting and the occurrence of adolescent antisocial behavior (eg., Criss, Shaw, Moilanen, Hitchings, & Ingoldsby, 2009) and youth affiliation with deviant peers (e.g., Tarter et al., 2011). In countries such as Venezuela, however, few studies have examined these linkages (Aguilar-Gaxiola et al., 2006). Although rates of adolescent drug use are generally lower in Latin American countries than in the U.S. (PAHO, 2009) many of these countries are transitioning from primarily producers to consumers of illicit drugs (Medina-Mora & Rojas Guiot, 2003). Additionally, antisocial behaviors appear to be increasing in Venezuela (Granero, Poni, Escobar-Poni, & Escobar, 2011) underscoring the need to better understand their etiology. This paper adds to our understanding of how parents and peers influence negative youth outcomes by examining the ways in which parenting and two kinds of deviant peer groups may differentially influence adolescent externalizing behavior and drug use in a sample of Venezuelan youth.

## Background

### *Influence of Parenting during Adolescence*

Unsupportive parenting has been related to different aspects of antisocial behavior including drug use and externalizing behaviors during adolescence with positive associations found across national, ethnic, and socioeconomic groups (Claes et al., 2005; Vazsonyi, Trejos-Castillo, & Young, 2008). Family dynamics influencing parenting have been found to differ somewhat between Latino and non-Latino cultures (Halgunseth, Ispa, & Rudy, 2006). Familismo, for example, is a cultural value that includes loyalty to family and the conceptualization of the family as the main source of emotional support (Updegraff, Kim, Killoren, & Thayer, 2010). Others have found that cultural norms stigmatize drug use in Latin American countries like Venezuela (Osorio Rebolledo, Ortega de Medina, & Pillon, 2004), which along with the collectivist nature of Venezuelan society (Montilla & Smith, 2009) may elevate the relative influence of parents on adolescents' behavior. We add to this research by examining how unsupportive parenting may differentially affect adolescent externalizing behavior and drug use.

### **Influence of Peer Relationships**

Affiliation with deviant peers has been shown to be instrumental in the development and maintenance of antisocial behaviors (e.g., Engels et al., 2004; Tarter et al., 2011). There is, however, evidence that this link may differ among Venezuelan youth due, in part, to their school context. Venezuelan students attend school from either 7am-12pm or 1-6pm (León, Campagnaro, & Matos, 2007) resulting in the likelihood of spending more time with family than with peers, a finding consistent with other Latino countries (Larson & Verma, 1999). This may be why some have found deviant peer affiliations only mildly or moderately linked to drug use in Venezuela (Navarro & Pontillo, 2002; Osorio Rebolledo et al., 2004).

Furthermore, Cox, Danelia, Larzelere, and Blow (2012) have argued that because of the strong societal prohibition against drug use in Venezuela, there may be less peer support for and reinforcement of youth drug use, which, in turn, may decrease the attractiveness of using drugs. This suggests that peer relationships among Venezuelan youth are not as robust a context for drug use compared to American youth. To extend this line of work, we conceptualize two kinds of negative peer behaviors (viz., deviant behavior and drug use) as risk factors in the development of adolescent externalizing behavior and drug use.

### **Gender and Age as Moderators of Risk**

Gender and age are also important considerations when modeling youth outcomes (Campbell-Sills, Forde, & Stein, 2009). For instance, adolescent girls typically spend more time with parents at home (Montemayor, 1983), are more likely to be exposed to negative family experiences (Sheeber, Davis, & Hops, 2002), and are less likely to have deviant friends during childhood and adolescence (Lansford, Criss, Pettit, Dodge, & Bates, 2003) compared to adolescent boys. This suggests a stronger relationship between parenting and antisocial outcomes for girls, whereas deviant peer affiliations may be more strongly linked to antisocial outcomes for boys. This follows Claes et al. (2005), who reported that poor parenting was indirectly related to adolescent deviant behavior via peer orientation for boys but not girls, and a study of Venezuelan families found that parenting and time spent with deviant peers predicted antisocial behavior for both boys and girls, but was stronger for boys (Rodriguez, Miron, & Rial, 2012). In contrast, Brooks, Stuewig, and LeCroy (1998), using a Hispanic U.S. sample, found that the link between family dysfunction and adolescent drug use was mediated by perceived peer drug use for girls but not boys.

Age may also moderate parent/peer risk models. The influence of parents typically wanes during adolescence (Smetana & Bitz, 1996) with the impact of peer pressure peaking around age 14 and decreasing thereafter (Steinberg & Silverberg, 1986). Still, other studies have shown that parents are generally viewed to have legitimate authority over socially regulated acts (i.e., moral issues), such as engaging in deviant behavior and drug use, across adolescence (Smetana & Daddis, 2002).

### **Current Study**

This study adds to the literature in three important ways. First, we know of no previous studies that have examined, in one model, the relationship between deviant and drug-using peer affiliations and youth externalizing behavior and drug use. We hypothesized domain specific effects. That is, deviant peer affiliations would influence youth externalizing behaviors and peer drug use would be associated with youth drug use. Given the salient influence of families in Latin American culture, we hypothesized that the link between unsupportive parenting and negative outcomes would be only partially mediated by the peer variables. Second, we tested for gender and age differences in our proposed model. However, given the mixed findings in the literature, we had no formal hypotheses

about these associations. Finally, we conducted this study on a sample of youth from Venezuela, to broaden our understanding of these phenomena outside the U.S.

## Methods

### *Sampling Procedures*

Two school districts in Caracas were selected for the study. From these districts, schools were stratified in each district by grades 7 through 11 and by funding type (i.e., private or public). Next, a proportional allocation sampling procedure of private to public schools was performed resulting in 14 schools (six and eight, respectively) that were randomly selected from the pool of schools. Finally, one section from each grade was selected randomly and all students from the selected section present the day of data collection were invited to participate. Permission was obtained from the first author's university IRB, the Regional Director of the Federal District of Caracas, the superintendents of the two sampled school districts, and the principal of each school sampled.

### *Participants*

A sample of 1,814 respondents was drawn from the five grades (7<sup>th</sup> – 11<sup>th</sup>) that make up high schools in Venezuela. The mean age of the participants was 15.5 years and 53.3% were female. Over half lived in the poorest housing area (55.7%) and 30% reported either their father or mother as having finished a post high school degree (e.g., vocational, technical, university).

### *Measures*

Data were collected using a standardized self-administered questionnaire titled the Venezuelan Inventory of Drug Use (VIDU). The VIDU is a modification of the instrument used in the cross-national PACARDO study (Dormitzer et al., 2004) and was pilot tested and revised using a sample of adolescents and teachers in Venezuela to establish the face validity of the instrument and to ensure cultural fit and accuracy before its implementation.

Youth drug use. Five items measured participating youth's drug use, "*During the last year, how often did you use (name of drug)?*" for each drug in the study: alcohol, tobacco, cocaine and derivatives (i.e., crack, coca-base), heroin, and marijuana. A five-point response scale was used for each of the drugs ranging from 0 (*not even once*) to 4 (*once or more per day*). Youth drug use is an observed variable calculated by summing the five drug use items. Higher scores indicate more frequent use.

Youth externalizing behavior. Externalizing behavior measures the extent youth participate in delinquent acts and risky behavior and was adapted from the Drug Use Screening Inventory (Tarter & Hegedus, 1991) for use in research on non-clinical samples. Seven items make up a latent construct (e.g., *Have you intentionally damage another person's belongings during the last year?*) of which

all had significant factor loadings above .4, and an adequate internal consistency ( $\alpha = .63$ ). Items are all yes/no responses (yes = 2) such that higher scores indicate higher levels of externalizing behavior.

Peer drug use. Peer drug use is an index of six items that assess the youth's perception of drug use among his/her peer group (e.g., *"Some of my friends have smoked marihuana."*). Similar questions were asked of other drugs and were summed to create a continuous variable. Each item was scored using yes/no responses (yes=2) such that higher scores indicated greater peer drug use. The summed scale was then centered to reduce collinearity and increase interpretability. Internal consistency is not reported for peer drug use because it is an index and does not assume homogeneity of variance underlying most tests of internal consistency.

Peer deviant behavior. The youth's perceptions of deviant behavior among his/her peer group is an observed variable constructed by summing four items (e.g., *Have some of your friends stolen, or damaged another person's belongings on purpose?*). All items were scored with yes/no responses (yes=2) with higher scores indicating increases in peer deviance and centered to reduce collinearity and increase interpretability. Internal consistency was acceptable ( $\alpha = .70$ ).

Unsupportive parenting. Unsupportive parenting is a latent construct measured with nine items (e.g., *Your parents or guardians know how you think or feel regarding the things that are really important to you.* "Generally speaking, your parents or guardians know where you are and what you are doing") that were adapted from the Capaldi and Patterson scale on parental monitoring (Capaldi & Patterson, 1989), and expanded to include questions on affect and communication between parents and the adolescent. The nine items all had significant factor loadings above .4 and strong internal consistency ( $\alpha = .80$ ). Items used to measure the unsupportive parenting latent trait are all yes/no responses with high scores indicating higher levels of the trait.

Age. To address moderation effects in the multi-group models, age was dichotomized into two groups: younger (11-14 years old,  $n = 708$ ) and older (15-18 years old,  $n = 1106$ ).

## Analytic Plan

Structural equation modeling was used to test the direct and mediated effects of unsupportive parenting on previous 12-month drug use and antisocial behavior. The youth drug use variable was ordinal, which we treated as a count variable. When numerous participants do not indicate any previous use, this variable is called zero-inflated (Long, 1997). Since a zero-inflated Poisson model (ZIP) can be considered nested within a standard Poisson model, the zero inflation assumption was tested using a  $\chi^2$  difference test. Results indicated a significant difference between the two models so we proceeded with the ZIP model. The ZIP model allowed us to simultaneously estimate two regressions. First, a logistic regression predicted the probability of being in the true nonuse category (i.e., a latent class of individuals who would never use that drug that year). The second regression used a Poisson distribution to predict the frequency or extent of use among the latent class of those who would use that drug, including users estimated

to use it zero times according to the Poisson distribution. It should be noted that both the “probability of use” and the “extent of use” resulted from the same original youth drug use variable. Paths to the binary portion of the outcome variable are understood as odds ratios (OR) or the percentage increase in the odds of the behavior given a one-unit increase in the covariate. Likewise, paths to the count portion of the youth drug use variable are understood as incidence rate ratios (IRR) or the percentage increase in the odds of increasing the expected count of drug use by one given a one-unit increase in the covariate. The null hypothesis used to interpret OR and IRR values is 1.00, with values under 1 indicating a negative association and values over 1 indicating a positive association. Confidence intervals for the indirect effects were constructed using PRODCLIN (MacKinnon, 2008). All analyses were run in Mplus v.6 (Muthén & Muthén, 1998-2010) using full information maximum likelihood with robust standard errors for categorical outcomes. A multilevel option was used to account for the non-independence in the data due to clustering within schools, and missing values were handled using full information maximum likelihood estimation.

## Results

### *Model Building*

Following the two-step modeling approach recommended in Anderson and Gerbing, 1988, we first tested a measurement model of the hypothesized latent variables before evaluating our structural path models of interest. Confirmatory factor analysis was used to test the factor structure of the latent constructs. With large samples adequate fit is indicated by a normed Chi square ( $\chi^2$  model/df)  $\leq 5$  (Bollen, 1989), CFI  $> .95$ , TLI  $> .90$  (Hu & Bentler, 1999), and/or a RMSEA  $\leq .05$  (Kline, 2005). The measurement model fit the data adequately,  $\chi^2 (97, n = 1,815) = 134.37$ ,  $p = .007$  CFI = .98, TLI = .98, RMSEA = .015. All standardized factor loadings were highly significant and greater than .40. Next, a structural path model was used to test direct and indirect associations among the study constructs controlling for gender and age. Our hypothesized models are shown in Figures 1-3. A multi-group procedure was used to test for differences by gender and age (younger [11-14 years], and older [15-18 years]) using the known class command in Mplus v.6 (Muthén & Muthén, 1998-2010).

We first regressed youth externalizing behaviors and drug use on unsupportive parenting. A standard deviation increases in unsupportive parenting was associated with .86 standard deviation increase in externalizing behaviors in youth, a 143% increase in the odds of having used a drug and 118% increase in the odds of increasing the extent of use within the past year. Being male was associated with a .26 standard deviation increase in externalizing behaviors and 19% increase in the extent of drug use, but was not significantly associated with the probability of use. Being in the older youth category was associated with a 217% increase in the probability of having used a drug, but was not significantly related to either youth externalizing behaviors or the extent of drug use.

Next, we added the two mediators (peer deviant behavior and peer drug use) and fit a model that regressed the youth externalizing behavior latent

construct and the youth drug use measure on the two peer variables and unsupportive parenting (see Figure 1). Although not shown in the figure, the model controlled for age and gender. Significant indirect relationships were regarded as full mediation if the direct effects of parenting on youth adjustment were no longer significant and partial mediation if the direct effects remained significant after controlling for the mediating variables (Little, Card, Bovaird, Preacher, & Crandall, 2007). The tests of indirect effects are summarized in Table 1.

### *Youth Externalizing Behaviors*

Unsupportive parenting was significantly and positively related to peer deviant behavior, which in turn was significantly and positively associated with youth externalizing behavior. The indirect coefficient for this pathway was significant (see Table 1) and the link between unsupportive parenting and youth externalizing behavior remained significant, indicating that peer deviant behavior partially mediated this path. Unsupportive parenting also was positively related to peer drug use, which in turn was positively related to increases in youth externalizing behavior. The mediational path was not significant, however, according to the asymmetric products test. Additionally, males were significantly more likely than females to report engaging in externalizing behavior ( $\beta=-.23$ ,  $p<.001$ ), though age was not a significant predictor.

### *Youth Drug Use*

Unsupportive parenting was positively related to peer deviant behavior, but peer deviant behavior was not significantly related to the probability of having used drugs (OR) or the extent of use (IRR), and the indirect effect was not significant. Unsupportive parenting also was significantly and positively related to peer drug use, which in turn was significantly and positively related to the extent of drug use, but not to the probability of use. The direct link between unsupportive parenting and extent of youth drug use remained significant and the indirect effect coefficient was significant (see Table 1), providing evidence for partial mediation. The direct link from unsupportive parenting to the probability of having used a drug was not significant and the test for mediation via peer drug use was not significant. Males were not more likely than females to have used a substance in the past year, nor was their extent of use significantly different from female users (IRR=.88,  $p<.09$ ). Older youth were much more likely to have used (OR), but age did not significantly influence the extent of use for users (IRR).

### *Tests of Moderation*

Next, multi-group models were used to test whether the model's direct and indirect effects varied by gender or age. First, a fully constrained model was compared to a model in which constraints were relaxed. Chi squared difference tests for the multi-group models showed significant differences for gender,  $\chi^2(17) = 566.56$ ,  $p < .001$ , and for age,  $\chi^2(17) = 1089.48$   $p < .001$ , indicating that at least some of the paths differed for each of the models, and therefore tests for

moderation were appropriate. Next, post hoc analyses were conducted by selectively constraining paths to assess which paths varied by gender or age.

Gender. As indicated in Figure 2 and Table 1, the pattern of associations among variables in the multi-group model was similar for boys and girls with the following exceptions: The path from peer deviant behavior to the likelihood of having used drugs was significant for girls but not boys, and the path from unsupportive parenting to peer deviant behavior was considerably stronger for boys compared to girls. The mediation analyses indicated one gender difference: Peer deviant behavior mediated the link between unsupportive parenting and the probability of having used drugs (OR) for girls but not for boys. Moreover, the path from unsupportive parenting to the probability of drug use was not significant indicating that peer deviant behavior fully mediated this path.

Age. The multi-group model indicated four direct paths and three mediated paths that varied by age group. In all cases the following paths were significant for older but not for younger youth: from peer deviant behavior to the probability of drug use (OR), from peer drug use to youth externalizing behavior, from peer drug use to probability of drug use (OR), and from unsupportive parenting to extent of use (IRR). Peer drug use partially mediated the link between unsupportive parenting and youth externalizing behavior for older youth but not younger youth. Peer deviant behavior fully mediated the link between unsupportive parenting and the probability of drug use (OR) among older but not younger youth. Although the link between parenting and extent of drug use via peer drug use was significant for both older and younger youth, it was fully mediated for younger youth but only partially mediated for older youth. Additionally, the influence of drug using peers was notably stronger among younger youth (IRR=1.47) compared to older youth (IRR=1.13).

## Discussion

This study examined how parenting and peer influences related to adolescent antisocial behavior and past 12-month drug use among Venezuelan youth. Findings indicated that unsupportive parenting was strongly associated with adolescent externalizing behaviors and extent of drug use. However, whether peer deviance or peer drug use mediated the relations depended on the outcome variable and, at times, the moderator.

### *Youth Externalizing Behavior*

Unsupportive parenting was significantly associated with youth externalizing behaviors, and this association remained significant even after accounting for the variance explained by the deviant peer variables. This suggests that parent and peer risks overlap and work together in additive ways to predict antisocial behavior. In other words, the risks are related to each other but each adds some unique power to the prediction of the risk outcome. The finding that there is some unique prediction from parenting coincides with other studies using Latino samples where families have been found to exert a protective influence against youth antisocial behaviors through familismo and other values embedded within a collectivistic culture (Updegraff et al., 2010).

Although U.S.-based studies have found poor parenting to be indirectly related to adolescent deviant behavior via peer orientation for boys but not girls (Claes et al., 2005), this finding was not replicated from our data. Rather, the influence of peer deviant behavior was virtually the same for males and females on youth externalizing behavior. These findings may suggest that traditional Latino gender-based norms prevalent since Spanish colonialism (Rocha-Sánchez & Díaz Loving, 2005) are losing power in some parts of Latin America. Global markets, consumerism, and influences from mass media have exposed young people to more flexible gender roles (Marsiglia & Holleran, 1999), which may include increased exposure to peers that exhibit externalizing behaviors.

Finally, peer drug use partially mediated the path from unsupportive parenting to antisocial behavior for older but not younger youth. This may suggest a difference in age when peer pressure seems to peak due to the emphasis placed on family values and parental respect in Venezuelan culture. Additionally, unsupportive parenting remained significant in both mediation models, which is consistent with U.S. studies suggesting that parents tend to maintain authority over socially regulated acts, such as engaging in deviant behavior and substance use, across adolescence (Smetana & Daddis, 2002).

### *Youth Drug Use*

Perhaps one of the more intriguing findings of this study was the relation between unsupportive parenting, the two peer variables, and the way in which they uniquely influenced different aspects of drug use behavior in the model. Unsupportive parenting was significantly associated with increases in the extent of drug use, but not of the probability of drug use. While somewhat counter-intuitive from a U.S. cultural perspective, these findings seem to fit in the context of Latino culture where there is greater acceptability of adolescent alcohol use. For example, in Mexico, it is much more socially accepted for adolescents to consume alcohol compared to youth in the U.S. (Latimer et al., 2004), and many (74.6%) report drinking at family gatherings (Medina-Mora et al., 2001). It may be that among Latino families in general, the family influence against drinking only becomes prevalent when drinking becomes excessive.

Similarly, we found that peer deviant behavior was not associated with either aspect of drug use, and that peer drug use was only associated with the extent of use but not the probability of use. These findings may suggest that in Venezuela there are distinct deviant peer groups that play different roles in the development of substance use. That is, while having an increased number of peers who are involved in deviant behaviors increases a youth's propensity toward delinquent behavior, youth who begin to use drugs more heavily transition into a drug-using culture characterized by drug-using friends. This coincides with others who found that perceptions of social tolerance of drug use are positively correlated with its use (Medina-Mora & Rojas Guiot, 2003) among Mexican youth.

One unexpected finding was that peer drug use did not seem to influence the probability of having used drugs in the past year. This finding may, again, be related to the overall social acceptability of alcohol use, which lessens friends' influence. The lack of acceptability for or social stigma against illicit drug use in Venezuela may also affect peer influence. Studies have consistently shown that illicit substance use is considerably lower among youth in most Latin American countries compared to youth in the U.S. (PAHO, 2009). In our sample, lifetime prevalence for marijuana was only

3.5% compared to 36.8% among youth in the U.S. (CASA, 2011). Therefore, fewer youth will have many friends who use drugs besides alcohol and cigarettes, and that these will be older compared to younger youth. Although studies in Latin America have found friends to be the most common source of drug offers (Medina-Mora et al., 2001), due to the strong societal prohibition against illicit drug use in Venezuelan, youth may not talk as openly about their drug use, and especially younger youth, further diluting the link between peer drug use and the probability of having used a drug. Future studies that test the influence of peers on different drugs is needed to determine these relationships.

Peer drug use partially mediated the link between parenting and the extent of drug use, but not the probability of its use suggesting a direct and indirect link between parenting and the extent of drug use among adolescents. It seems that parent-child relationships characterized by positive affect, open communication, and appropriate supervision help youth form the strong family bonds that protect them from drug using friends and transfer values that make drug use less attractive. The mediation results suggest that adolescents in Venezuela whose needs for support are not met in their families may find this support by affiliating with a deviant peer group. However, family values and other factors such as a familial history of substance abuse may determine, in part, which friends the youth becomes involved. This, in turn, shapes whether youth move toward increases in externalizing behavior or drug using behavior. It is possible that youth who have observed parents, siblings, and peers using drugs are more likely to do so themselves (Collins & Ellickson, 2004), while other youth will be drawn to externalizing friends for similar reasons. While future research needs to test these hypotheses, they hold interesting implications for screening tools and for formulating intervention programs targeting this age group.

The indirect path from unsupportive parenting to the probability of use via peer externalizing behavior was only significant for females. Research on youth development has found that females tend to be more concerned about relationships than are males (Surrey, 1991), and their initiation into substance use tends to be related to personality factors such as self-image (Slater, Guthrie, & Boyd, 2001), tendencies that may increase female susceptibility to peer influences. Additionally, since social mores in Latin American countries make it more normative for males to use drugs than for females (Kulis, Marsiglia, & Hecht, 2002), males may engage in use, in part, due cultural expectations making peers a relatively weaker influence in their probability to use compared to females.

The findings also suggest that as youth get older whether they used drugs in the past year depends on how parenting influences contact with antisocial peers. This also suggests a different mechanism at work for younger youth. Interestingly, there were no significant differences by age in the extent of use, and only peer drug use mediated the path from unsupportive parenting to the extent of drug use for both older and younger youth. However, this path was only partially mediated for older youth, but fully mediated for younger youth. It may be that older youth who begin using drugs are able to maintain some sort of connection with their parents such that parenting continues to affect the extent of use independent of peer influences. However, among younger youth, once drug use begins, drug-using peers are much more influential and parental influence is only through the reduction of affiliation with drug using peers. Although peer drug use was a stronger influence on the extent of use for younger compared to older youth, this is not to say that younger youth used more drugs than

did older youth. In fact, in our sample, only 40% of younger youth had used drugs during the past year, compared to 67% of older youth.

The findings on age differences hold important implication for public health initiatives since younger initiation of substance use is strongly linked to later dependence. For example, Hingson, Heeren, and Winter (2006) found that 45% of U.S. adults who began drinking by age 14 became dependent on alcohol at some point in their lives versus 9% who began drinking at age 21 or older. Still, due to the exploratory nature of our study, these findings are only preliminary at this point, and more research is needed to replicate these findings in other samples.

### **Limitations, Conclusions, and Future Directions**

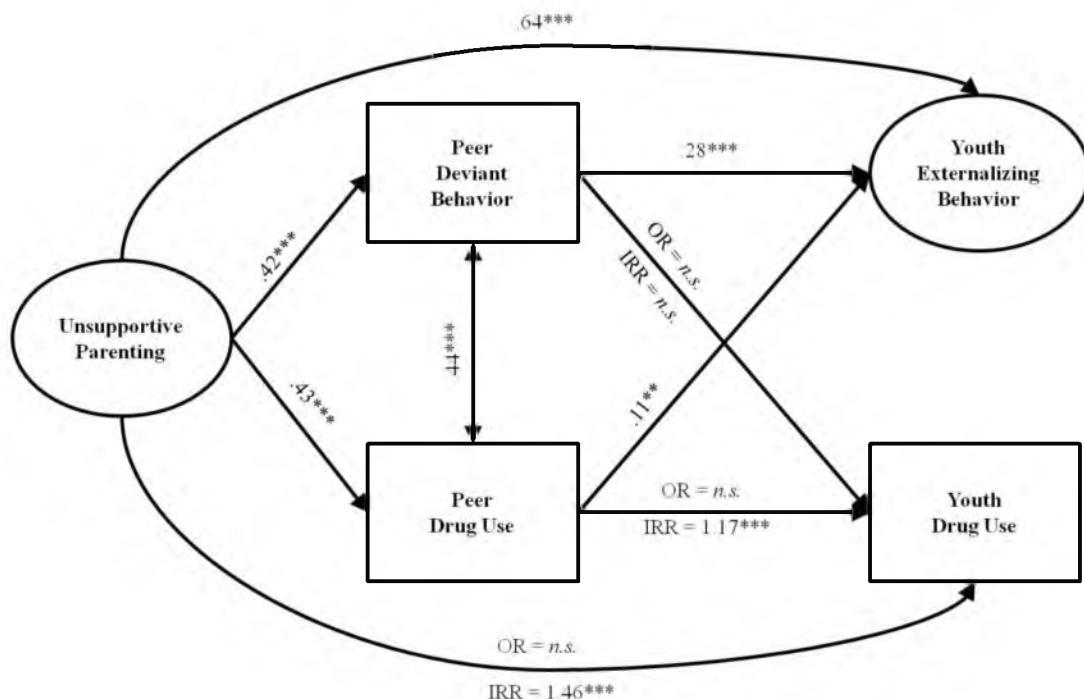
Several limitations should be considered when interpreting these findings. First, the study is cross-sectional, which suggests the usual cautions about inferring causality. Second, although the study is a representative sample of two school districts in Venezuela, the findings should not be generalized to all of Venezuela and even less so to Latino populations in general due to the heterogeneity in Latino cultures. Third, the study relied exclusively on child report, which allows for possibility of a single source bias in the reporting of behaviors. Fourth, while providing a first step in examining how distinct peer groups might affect domain specific outcomes among youth, combining licit and illicit substance use together does not allow for a more nuanced treatment of these differences.

Notwithstanding these limitations, the paper reports on characteristics of an understudied population and adds to our understanding of the interactive contributions of parents and peers to adolescent problem behavior in several ways. First, it suggests that traditional approaches of combining peer behaviors into a single group of antisocial peer influences may be insufficient to explain the distinct outcomes among adolescents in different cultural groups. Youth from cultural groups, such as Venezuela, that stigmatize the use of drugs more than occurs in the U.S. are influenced by distinct groups for externalizing behaviors compared to drug using behaviors. Second, it replicates in a South American sample findings from U.S. samples (e.g., Criss et al., 2009) that parent and peer influences are non-redundant, that they contribute in additive ways to adolescent problem behavior as well as through mediated pathways. Third, important differences were found by allowing the models to vary by gender and age. Future studies should continue to explore how gender and age differences moderate adolescent antisocial behaviors to suggest distinct strategies for the prevention of negative adolescent outcomes by subgroup. Fourth this paper avoids the problems associated with collapsing the tail of non-normal distributions into a binary outcome of "use" or "no use." Interesting differences in how families and peer groups differentially influence either the probability or the extent of use were found by using an approach that models both the excess of zeros and the tail of the distribution.

**Table 1**  
*McKinnon's Asymmetric Products Test for Indirect Effects*

	Externalizing Behavior		Probability of No Drug Use		Extent of Drug Use	
	B	95% CI	OR	95% CI	IRR	95% CI
<u>Full Model</u>						
Unsupportive Parenting via:						
Peer Deviant Behavior	.18*	[.12, .25]	1.14	[.99, 1.32]	1.01	[.97, 1.04]
Peer Drug Use	.07	[-.02, .10]	1.10	[.91, 1.31]	1.09*	[1.05, 1.13]
<u>Males</u>						
Unsupportive Parenting via:						
Peer Deviant Behavior	.30*	[.19, .42]	1.11	[.68, 1.80]	1.01	[.97, 1.05]
Peer Drug Use	.13*	[.06, .20]	1.30	[.88, 1.96]	1.12*	[1.08, 1.17]
<u>Females</u>						
Unsupportive Parenting via:						
Peer Deviant Behavior	.18*	[.13, .23]	.97	[.79, 1.19]	1.01	[.97, 1.05]
Peer Drug Use	.09*	[.03, .15]	1.01	[.71, 1.44]	1.16*	[1.06, 1.28]
<u>Younger Youth</u>						
Unsupportive Parenting via:						
Peer Deviant Behavior	.19*	[.08, .33]	.97	[.79, 1.19]	.99	[.92, 1.06]
Peer Drug Use	.04	[-.03, .12]	1.01	[.71, 1.44]	1.16*	[1.06, 1.28]
<u>Older Youth</u>						
Unsupportive Parenting via:						
Peer Deviant Behavior	.20*	[.12, .28]	1.40*	[1.15, 1.72]	1.00	[.96, 1.04]
Peer Drug Use	.07*	[.004, .14]	1.22	[.99, 1.50]	1.07*	[1.04, 1.10]

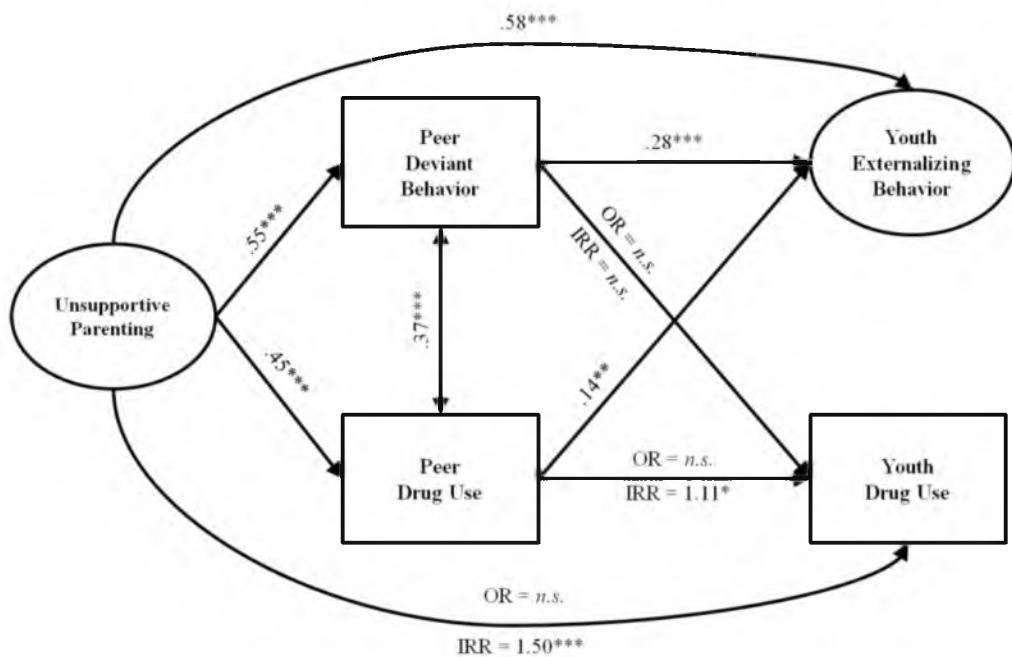
*Note:* \* $p < .05$ ; OR refers to the odds ratio of being in the non-user group. IRR refers to the incidence rate ratio for those in the user group. CI refers to confidence interval



*Figure 1. Additive Zero-Inflated Poisson (ZIP) Model – Controlling for Age and Gender.* Note: All coefficients are reported as standardized betas with the exception of binary (odds ratios or OR) and count variables (incidence rate ratios or IRR).

\*\*\* $p < .001$ , \*\* $p < .01$

Males:



Females:

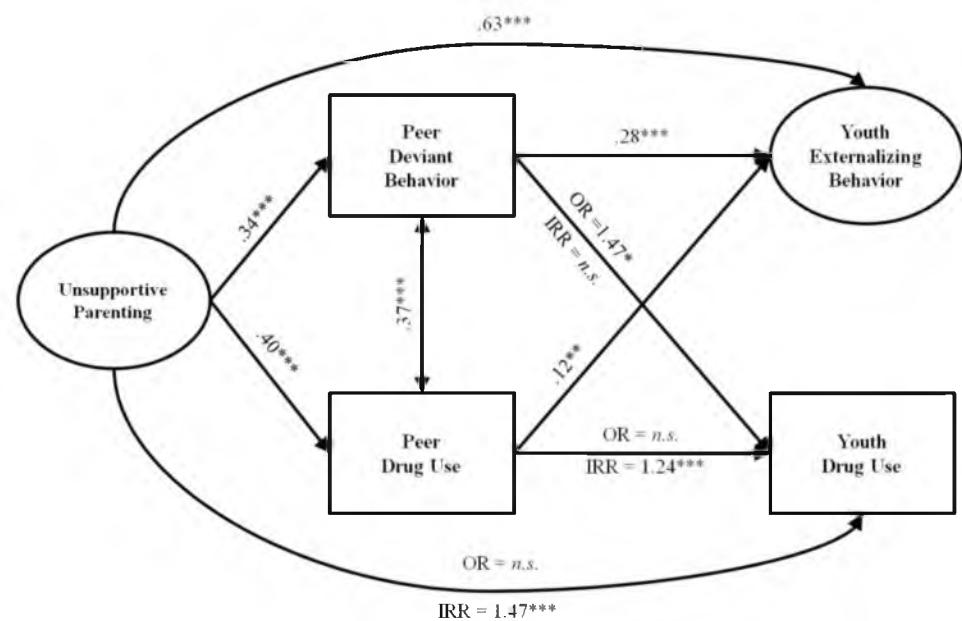
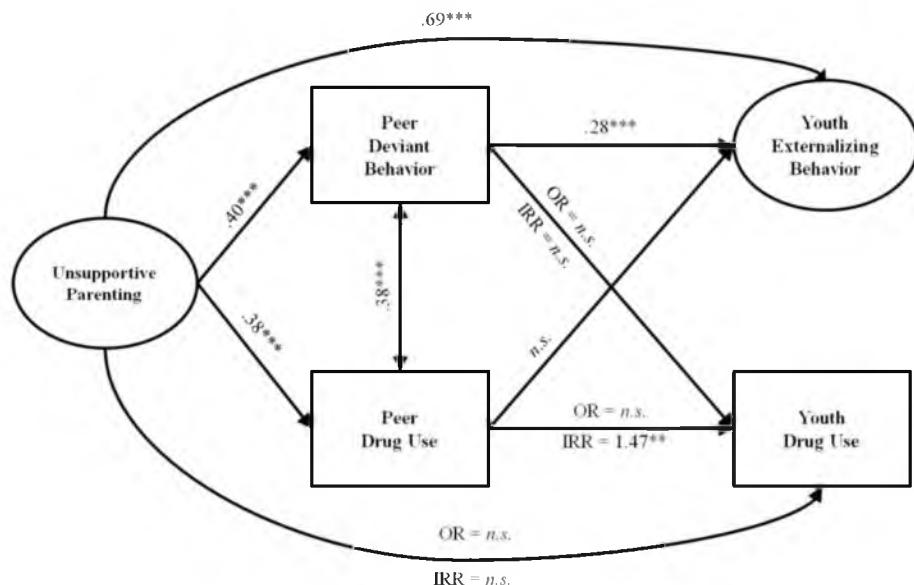
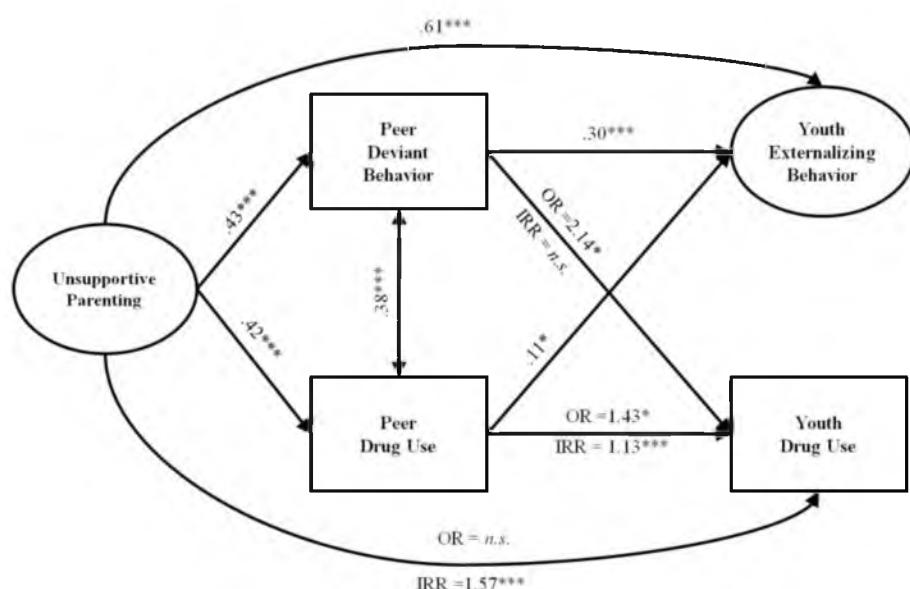


Figure 2. Multi-group Zero-Inflated Poisson (ZIP) Model—By Gender Controlling for Age. Note: \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ ; Top figure = males, bottom figure = females. All coefficients are reported as standardized betas with the exception of binary (odds ratios or OR) and count variables (incidence rate ratios or IRR). The covariance between peer externalizing behavior and peer drug use was held equal across both groups.

Younger:



Older:



**Figure 3.** Multi-group Zero-Inflated Poisson (ZIP) Model – By Age Controlling for Gender. Note: \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ ; Top figure = younger youth, bottom figure = older youth. Coefficients are reported as standardized betas with the exception of binary (OR=odds ratios) and count variables (IRR=incidence rate ratios). The covariance between peer externalizing behavior and peer drug use was held equal across both groups.

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