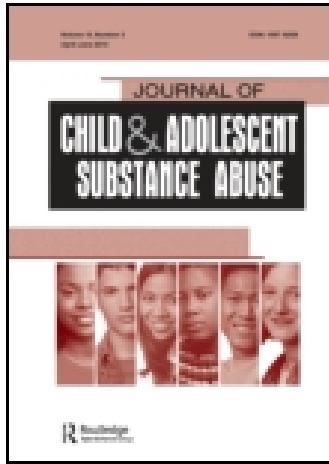


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## Journal of Child & Adolescent Substance Abuse

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/wcas20>

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Published online: 01 Oct 2014.

To cite this article: Paula J. Fite, Michelle L. Hendrickson, Spencer Evans, Sonia L. Rubens, Michelle Johnson-Motoyama & Jessica Savage (2014) Associations Between Proactive and Reactive Subtypes of Aggression and Lifetime Substance Use in a Sample of Predominantly Hispanic Adolescents, *Journal of Child & Adolescent Substance Abuse*, 23:6, 398-406, DOI: [10.1080/1067828X.2012.748440](https://doi.org/10.1080/1067828X.2012.748440)

To link to this article: <http://dx.doi.org/10.1080/1067828X.2012.748440>

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# Associations Between Proactive and Reactive Subtypes of Aggression and Lifetime Substance Use in a Sample of Predominantly Hispanic Adolescents

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The current study evaluated the link between proactive (goal-oriented) and reactive (behavior in response to a perceived threat) aggression and lifetime alcohol, tobacco, and marijuana use in a sample of 152 predominantly Hispanic (94.7%) high school students. Furthermore, the impact of neighborhood violence and gender invariance on these associations were examined. Findings suggested unique associations between proactive, not reactive, aggression and use of all three substances. No significant interactions between the aggression subtypes and neighborhood violence were evident, and no gender differences emerged. Findings suggest targeting proactive aggression for the prevention of substance use for both males and females.

*Keywords:* neighborhood violence, proactive and reactive aggression, substance use

## INTRODUCTION

Youth substance use remains a public health concern, with early use associated with increased risk for later abuse and use-related problems (e.g., Ellickson, Tucker, Klein, & Saner, 2004; Jacobsen et al., 2005; Tucker, Ellickson, Orlando, Martino, & Klein, 2005) along with substantial financial costs to individuals and society as a whole (Miller, 2004; National Research Council, 2004). Current early substance use prevention and intervention programs have been found to be limited in their effectiveness (Ennett et al., 1994; Ennett et al., 2003; Waldron & Turner, 2008). Thus, a better understanding of factors that influence risk for early substance use is important for the improvement of current substance use prevention and intervention strategies. There is growing evidence to suggest distinct associations between proactive (goal-oriented) and reactive (response

to a perceived threat) aggression and early substance use (for review, see Fite, Schwartz, & Hendrickson, 2012). However, findings are not consistent across studies, and potential moderators of these associations have not been adequately examined. Furthermore, associations between these aggression subtypes and substance use have yet to be examined among Hispanic youths, a group of individuals who have been identified as being at increased risk for early substance use (e.g., Johnston, O'Malley, Bachman, & Schulenberg, 2011). Accordingly, the current study examined associations between proactive and reactive aggression and alcohol, tobacco, and marijuana use in a sample of predominantly Hispanic adolescents. Neighborhood violence was examined as a moderator of these associations, and gender differences were evaluated.

## Proactive and Reactive Aggression and Substance Use

Although aggression is sometimes discussed as a broad, uniform construct, there is a great deal of theoretical

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and empirical research providing evidence for two functionally distinct subtypes of proactive and reactive aggression (Dodge & Coie, 1987; Fite, Colder, & Pelham, 2006; Little, Henrich, Jones, & Hawley, 2003; Vitaro & Brendgen, 2012). Proactive aggression is considered a goal-oriented behavior committed in order to obtain some reward as the anticipated outcome. By contrast, reactive aggression is conceptualized as an impulsive behavior committed in response to a perceived provocation or threat (Dodge & Coie, 1987). Despite some degree of conceptual and statistical overlap, these two constructs are best explained by different theoretical models and are associated with a range of divergent psychosocial correlates and developmental outcomes (e.g., Fite, Raine, Stouthamer-Loeber, Loeber, & Pardini, 2010; Raine et al., 2006; Vitaro & Brendgen, 2012).

Theoretically, there is support for both proactive and reactive aggression to be associated with early substance use, but through different pathways. Proactive aggression tends to be associated with a developmental progression of antisocial and delinquent behavior, including substance use, which begins in early childhood and increases in severity through adolescence and into adulthood (e.g., Fite et al., 2010; Moffit, 2003; Vitaro, Gendreau, Tremblay, & Oligny, 1998). The relations between reactive aggression and substance use cannot be explained by this developmental model of antisocial behavior (Fite et al., 2010; Fite et al., 2012; Vitaro & Brendgen, 2012). Rather, reactive aggression is characterized by specific risk factors for substance use, such as impulsivity (e.g., Acton, 2003; Moeller & Dougherty, 2002). Reactive aggression is also associated with internalizing symptoms, which is a risk factor for adolescent substance use (i.e., depression and anxiety; King, Iacono, & McGue, 2004; Pardini, Lochman, & Wells, 2004).

There is limited research evaluating associations between these aggression subtypes and substance use. To date, only six have examined these associations (for a review, see Fite et al., 2012). Proactive aggression has consistently been linked to substance use behaviors (i.e., frequency of use, number of different drugs used) both cross-sectionally and longitudinally (Fite, Colder, Lochman, & Wells, 2007; Fite et al., 2010; Pulkkinen, 1996), suggesting that proactive aggression is associated with continued substance use throughout the life span. These relations have held across clinical and community samples (Connor, Steingard, Anderson, & Melloni, 2003; Fite et al., 2010; Miller & Lynam, 2006; Pulkkinen, 1996). Findings for reactive aggression are less consistent, and appear to be at least partially dependent upon the population being examined. Specifically, linkages between reactive aggression and substance use appear to be more evident in samples of clinically referred and aggressive samples of youths than in

community samples (Connor et al., 2003; Fite et al., 2007; Fite, Colder, Lochman, & Wells, 2008; Miller & Lynam, 2006; Pulkkinen, 1996).

These studies further suggest that reactive and proactive aggression are differentially associated with the use of specific substances. Proactive aggression appears to be uniquely and directly related to alcohol use in childhood and adolescence as well as problem drinking in adulthood (Fite et al., 2008; Fite et al., 2010; Pulkkinen, 1996). Reactive aggression seems to have a stronger association with use of tobacco and illicit substance use (rather than alcohol use), particularly when examining associations over time (Fite et al., 2008; Fite et al., 2010).

Important gender relations between subtypes of aggression and substance use have not been thoroughly examined. Of only four studies known to exist in the literature, two have found pronounced gender differences (Connor et al., 2003; Fite et al., 2007; Miller & Lynam, 2006; Pulkkinen, 1996). These studies demonstrated that proactive aggression was associated with substance use in both males and females (Connor et al., 2003; Pulkkinen, 1996). However, Pulkkinen (1996) found gender differences when examining use of specific substances, with proactively aggressive females, but not males, being more likely to use tobacco. Connor and colleagues (2003) found a unique association between reactive aggression and substance use in males. Fite and colleagues' (2007) study appears to be the only one to have investigated gender differences in the developmental trajectory of substance use (from fifth to eighth and ninth grade). Although no gender differences in peer-mediated pathways were found in late childhood, gender differences may emerge at different times of development. In order to further understand the pathways from proactive and reactive aggression to substance use, research needs to examine gender differences at different ages (e.g., adolescence instead of late childhood) as well as for the impact of specific environmental factors, including neighborhood violence.

### The Impact of Neighborhood Violence

Neighborhood violence can include witnessing, being a victim of, or hearing about violent acts such as a shooting, stabbing, mugging, or rape in the area in which one resides (Buka, Stichick, Birdthistle, & Earls, 2001). Research has found that exposure to neighborhood violence is related to a host of negative outcomes, including symptoms of depression, posttraumatic stress disorder, and aggression (e.g., Gorman-Smith & Tolan, 1998; Kilpatrick et al., 2000; Overstreet & Braun, 2000). Most relevant to the current study, prior research has consistently found a link between neighborhood violence and increased levels of substance use (Vermeiren,

Schwab-Stone, Debutte, Leckman, & Ruchkin, 2003; Winstanley et al., 2008). For example, Kulis, Marsiglia, Sicotte, and Nieri (2007) found disadvantaged neighborhoods, where poverty and crime is prevalent, to be associated with increased substance use in Latino middle school youths.

These associations may be explained by the neighborhood disorder model, which posits that neighborhood incivilities and violence contribute to residents' fear of crime, which in turn is associated with a host of mental health outcomes such as depression, delinquency, and substance use (Wandersman & Nation, 1998). Neighborhood violence may also result in substance use for modeling and/or coping reasons. That is, an individual living in a violent neighborhood is likely to witness individuals using substances (Buka et al., 2001), which may model substance use behavior. Neighborhood violence may also result in substance use in order to cope with negative emotions experienced as a result of living in a violent neighborhood (Aneshensel & Sucoff, 1996).

Developmental ecological models suggest that various individual (i.e., aggression) and contextual risk factors, including neighborhood violence, interact with one another to contribute to the development of behavior (Bronfenbrenner, 1979; Bronfenbrenner & Evans, 2000). Indeed, evidence suggests that neighborhood factors interact with individual and other contextual risk factors to predict child problem behavior (e.g., Barry, Lochman, Fite, Wells, & Colder, 2012; Colder, Lengua, Fite, Mott, & Bush, 2006; Lynam et al., 2000). For example, Brody and colleagues (2003) found that family factors, such as harsh parenting and older sibling problem behavior, were most strongly associated with the development of conduct problems in younger siblings for families who lived in more problematic neighborhoods. However, the impact of neighborhood violence on the link between these aggression subtypes and early substance use has not been examined. Evaluating the interacting impact of proactive and reactive subtypes of aggression and perceived neighborhood violence on substance use can help aid in the development of more effective targeted substance use prevention and intervention strategies. Accordingly, the effects of neighborhood violence on these associations were examined.

### Rates of Use Among Hispanic Adolescents

Hispanic youths appear to be at increased risk for early substance use compared to other ethnic and racial groups. For example, in a national sample of eighth-graders, Hispanic youths reported higher rates of use on almost all substances when compared to Caucasian and African-American youths (Johnston et al., 2011). In a large sample of adolescents, 52% of Hispanic teens reported that they had used substances in the past year,

while only 42% of African-American youths and 40% of Caucasian youths reported use in the past year (Partnership at DrugFree.org, 2012). Most notably, Hispanic youths appear to be at particular risk for marijuana use compared to other youths (50% use, 43% more than Caucasian youths and 25% more than African-American teens; Partnership at DrugFree.org, 2012). Thus, it is important to understand factors, including aggression, that contribute to early use in samples that include Hispanic youths.

### Current Study

In sum, the current study advances the aggression and substance use field by further examining the associations between proactive and reactive subtypes of aggression and lifetime substance use in adolescence. More specifically, the current study extends prior research by examining the following:

1. risk for use across three substances,
2. associations in a predominantly Hispanic sample,
3. the impact of neighborhood violence on these associations, and
4. gender differences in these associations.

Consistent with prior research, proactive aggression was expected to be positively associated with substance use, particularly alcohol use. Reactive aggression was expected to be associated with marijuana and tobacco use, but not alcohol use. Neighborhood violence was expected to strengthen the association between the aggression subtypes and substance use, such that individuals who exhibited high levels of aggressive behavior and perceived their neighborhood as violent would be most likely to have used substances. Finally, given no clear theoretical underpinnings to indicate gender differences and the mixed findings in previous research, no specific gender differences were posited.

## METHODS

### Participants

Participants were 152 adolescents ( $M$  age = 16.23 years, 54.6% male) recruited from a charter high school located in a large, Midwestern city. The overwhelming majority of adolescents, 94.7%, self-identified as Hispanic (choosing between two response options, "Hispanic or Latino" or "Not Hispanic or Latino"). According to the school, 95.4% of students at this school qualified to receive free or reduced-price lunch. Parental consent was obtained during parent-teacher conferences. Caregivers who attended conferences were provided with information

about the study by the research team. Since most caregivers at this school speak Spanish as their primary language, consent forms were provided in both English and Spanish. School-sanctioned translators assisted the researchers in providing families with information and answering their questions about the study. For those caregivers who did not attend parent-teacher conferences, consent forms were sent home with their children who could return the signed forms to the school; the school in turn provided the forms to the research team. Students who were 18 years old or older were allowed to provide their own written consent to participate. A total of 155 (77%) of the 207 students enrolled in the school provided written consent to participate in the study. Of those 155, a total of 142 received parental consent and 13 provided their own written consent. However, three children were absent on data collection days, resulting in a sample of 152. Approximately two-thirds of the consent forms returned to the research team were in the Spanish version of the form.

## Procedures

Participants completed the survey during a writing class, which all students in the school are required to take. The class sizes ranged from 9 to 24 students. One researcher was assigned to each class and no school personnel were present in the room during the administration of the survey. Researchers read each question aloud while participants completed the survey. The survey took approximately 30 minutes to complete. School personnel provided a list of students who may prefer to take the survey in Spanish. These students were given the option of completing the survey in Spanish; three completed the Spanish version. Participants were compensated \$5.00 for their participation. Study documents were translated by a school-sanctioned translator and were back-translated by an individual affiliated with the research team's institutional research center.

## Measures

### *Proactive and Reactive Aggression*

To assess proactive and reactive aggression, participating adolescents were administered Dodge and Coie's (1987) six-item proactive-reactive aggression rating scale. This measure consists of two subscales—proactive (three items) and reactive (three items) aggression—in which items are rated on a Likert scale from 0 (never) to 5 (almost always). Proactive and reactive aggression scores are calculated as the mean within each subscale. This measure has demonstrated strong reliability and validity in previous research (e.g., Dodge, Lochman, Harnish, Bates, & Pettit, 1997; Waschbusch, Willoughby, & Pelham, 1998),

as well as adequate internal consistency (proactive  $\alpha = 0.84$ ; reactive  $\alpha = 0.66$ ) in the present study.

### *Neighborhood Violence*

Exposure to neighborhood violence was measured using a five-item neighborhood violence rating scale (Sampson, Raudenbush, & Earls, 1997). Items asked participants to rate on a 4-point Likert scale how frequently (never, rarely, sometimes, or often) they were exposed to different kinds of violent events (i.e., fight involving a weapon, violent argument, gang fight, sexual assault or rape, robbery or mugging) within the past six months. This instrument demonstrated good internal consistency ( $\alpha = 0.83$ ) in the present sample.

### *Lifetime Substance Use*

Adolescents' lifetime use of cigarettes, alcohol, and marijuana was assessed using three items. Participants responded yes/no to indicate whether or not they had "ever" used any of the three substances. To eliminate confusion, items and directions also identified the various forms (e.g., beer, wine, hard liquor), units (e.g., can, glass, shot), and terms (e.g., grass, weed, pot) associated with the substances examined.

## RESULTS

Note that all analyses were estimated twice, once using the entire sample ( $N = 152$ ) and then again only including children who self-identified as Hispanic ( $N = 144$ ), and the pattern of findings were identical. Therefore, results for the entire sample are presented next.

### Descriptive Statistics

Descriptive statistics were evaluated using SAS 9.3 statistical software (SAS, 2010). Frequency data indicated that 78% of the sample had tried alcohol, 47% had tried tobacco, and 42% had tried marijuana. As expected, and consistent with prior literature (e.g., Fite et al., 2012), proactive and reactive aggression were strongly positively associated, suggesting that they share approximately 36% of their variance (see Table 1). Also consistent with expectation, proactive aggression was moderately positively associated with all three substances. In addition, reactive aggression was positively associated with marijuana use, had a marginally statistically significant positive association with tobacco use ( $p = .06$ ), and was unrelated to alcohol use. Finally, as anticipated, neighborhood violence was moderately positively associated with all three substances.

TABLE 1  
Correlations, Means, and Standard Deviations

Variable	1	2	3	4	5	6	7	8
1. Gender	–							
2. Grade	.02	–						
3. Cigarette use	-.12	.02	–					
4. Alcohol use	-.10	.03	.40**	–				
5. Marijuana use	-.10	.09	.64**	.43**	–			
6. Neighborhood violence	-.12	-.05	.24**	.18*	.25**	–		
7. Proactive aggression	-.07	-.03	.27**	.24**	.28**	.21*	–	
8. Reactive aggression	.03	-.08	.15	.11	.21**	.20*	.60**	–
<i>M</i>	–	10.35	.50	.80	.43	2.10	1.41	2.41
<i>SD</i>	–	1.11	.50	.41	.50	.80	.75	.84

Note. *M* = mean, *SD* = standard deviation, gender (1 = male, 2 = female).  
\**p* < 0.05. \*\**p* < 0.01.

Path Model

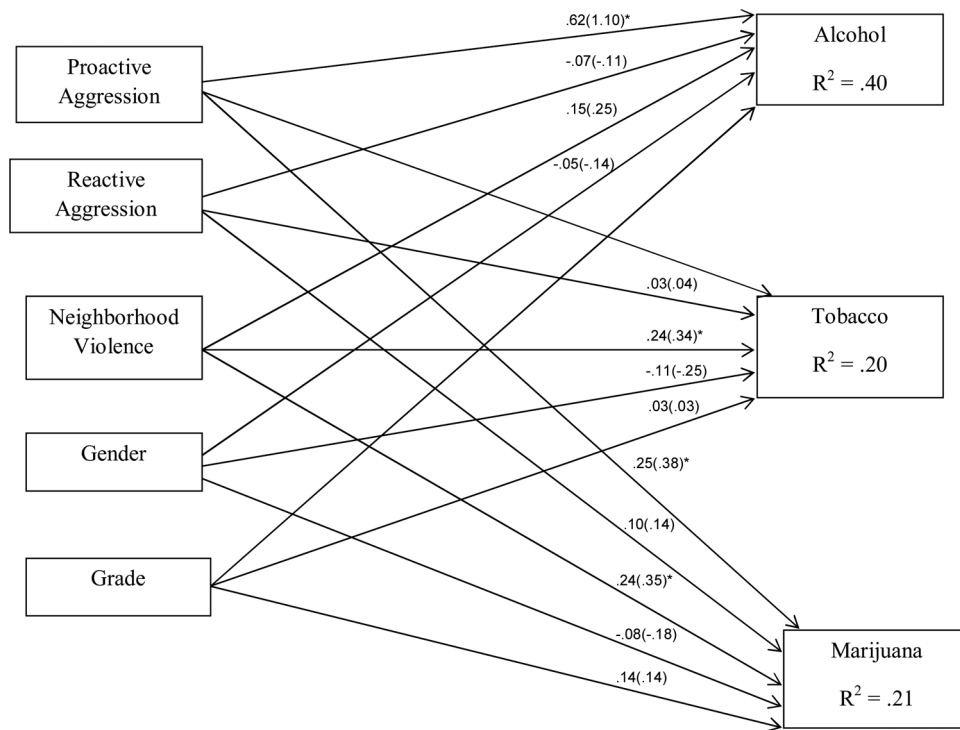
Path models were estimated using Mplus statistical software in order to determine the unique effects. The path model approach allowed for relations across the three substances to be examined simultaneously. Due to the dichotomous nature of the substance use variables, weighted least squares estimation with a mean and variance adjusted chi-square test statistic (WLSMV) was used. WLSMV provides unbiased estimates,

standard error, and model fit test statistics for dichotomous data (Muthén, 1984). The weighted root-mean-square residual (WRMR) statistic was used to evaluate model fit, whereby a WRMR value of <.90 indicates a good fit to the data (Yu & Muthén, 2001).

A path model in which alcohol, tobacco, and marijuana use were regressed on proactive aggression, reactive aggression, neighborhood violence, age, and gender was first estimated (see Figure 1), and this model provided a good fit to the data (WRMR = .001). Interestingly, proactive aggression was the only variable uniquely associated with alcohol use. Proactive aggression and neighborhood violence were positively associated with both tobacco use and marijuana use; however, reactive aggression was not uniquely associated with any substance.

Aggression × neighborhood violence interactions were then added to the model (WRMR = .000). However, no significant interactions emerged (*ps* = .10 and .95), suggesting that the influence of the aggression subtypes and neighborhood violence on substance use were independent of one another.

Finally, gender differences in all associations were examined by adding two-way and then three-way interactions to the originally estimated model. However, no significant interactions were found (*ps* ranging from .16 to .98), suggesting gender invariance in associations.



Note. \**p* < .05. Standardized betas reported outside parentheses and unstandardized betas reported inside parentheses.

FIGURE 1 Estimated path model.

## Post Hoc Analyses

As a follow-up analysis, a multiple regression model was estimated in order to determine whether proactive and/or reactive aggression were uniquely associated with the number of substances youths had tried. Twenty percent of the sample had not tried any substance, 27.33% had tried only one substance, 17.33% had tried two substances, and 35.34% had tried all three substances. Consistent with the individual substances, proactive ( $B = .43$ ,  $p = .00$ ), not reactive ( $B = .03$ ,  $p = .85$ ), aggression was uniquely associated with number of substances used, such that high levels of proactive aggression were associated with having tried more substances when also considering the variance associated with neighborhood violence ( $B = .33$ ,  $p = .01$ ), gender ( $B = -.19$ ,  $p = .29$ ), and grade ( $B = .07$ ,  $p = .36$ ). Neighborhood violence was then examined as a moderator of the associations between the aggression subtypes and number of substances, and no significant effects were found ( $ps > .60$ ). Finally, when gender differences were examined, by adding two- and three-way interactions to the model, no significant interactions emerged ( $ps > .20$ ).

## DISCUSSION

The present study sought to further examine associations between proactive and reactive subtypes of aggression and early substance use by examining the impact of neighborhood violence on these associations and evaluating whether associations varied as a function of gender. The current study also focused on a sample of predominantly Hispanic adolescents, a group of individuals identified as being at increased risk for early substance use (Johnston et al., 2011). Findings suggested that proactive, not reactive, aggression was uniquely associated with alcohol, tobacco, and marijuana use, and that these associations do not depend on levels of neighborhood violence or gender.

Proactive aggression appears to be a risk factor for early initiation of alcohol, marijuana, and tobacco use for both males and females. Findings are consistent with the overall findings of prior research, suggesting a link between proactive aggression and substance use (Fite et al., 2012). It is important to note, however, that prior research did not find a link between proactive aggression and frequency of illicit substance use (including marijuana) when longitudinal associations into adulthood were examined (Fite et al., 2010). Thus, it can be concluded that proactive aggression is associated with early initiation of various substances. Additional longitudinal research is needed to understand the impact of proactive aggression on the continued use of particular substances.

When examining bivariate associations, reactive aggression was associated with both tobacco and marijuana use, but not alcohol use. These findings are consistent with prior research that found a link between reactive aggression and timing of initiation of tobacco and marijuana use in an aggressive sample comprised of predominantly African-American youths (Fite et al., 2008). However, once taking into account the variance associated with both proactive aggression and neighborhood violence, reactive aggression was no longer associated with any substance in the present study. Thus, it appears that reactive aggression is not as strongly associated with early use as proactive aggression and neighborhood violence, particularly in a community sample of Hispanic youths.

Current findings suggest that associations between the aggression subtypes and substance use are similar for males and females. Prior research regarding gender differences has been mixed, with two studies suggesting notable differences and two studies suggesting no differences (Connor et al., 2003; Fite et al., 2007; Miller & Lynam, 2006; Pulkkinen, 1996). Taken together, it appears that gender differences are minimal and they may only be evident in specific samples for particular substances (e.g., cigarette use in Finnish samples; Pulkkinen, 1996).

Contrary to expectation, neighborhood violence did not impact associations between these aggression subtypes and any substance. Prior research has found that neighborhood characteristics interact with individual characteristics to impact problem behavior (e.g., Barry et al., 2012; Colder et al., 2006; Lynam et al., 2000). In the present study it appears that the influences of aggression and neighborhood violence on early use are independent of one another.

Of note, proactive aggression was more strongly associated with early alcohol use than neighborhood violence. Alcohol is a widely available and frequently used substance, with 78% of the current sample having tried the substance. Thus, the influence of neighborhood factors may not be as strong as the characteristics of the individual (i.e., level of aggression) that are associated with one's willingness to engage in alcohol use.

## Limitations

Despite the strengths of the current study, several limitations should be taken into consideration when interpreting findings. First, as with any school-based survey data, results are subject to the possibility of some potential selection biases. For example, students who were not consented or were absent or suspended from school during data collection may be more likely to engage in substance use. However, numerous efforts were taken—including translation of survey and consent

materials, exemption from some institutional review board (IRB) procedures (e.g., collection of social security numbers), collaboration with school staff, and incentives for participation—in order to facilitate high rates of consent and participation; indeed, consent and participation rates were relatively high. A second limitation is that the data used for these analyses were all reported by the adolescents themselves. The study could have benefited from additional raters (e.g., parents, teachers) as well as converging methods (e.g., neighborhood crime records). Note, however, that adolescents have been found to be accurate reporters of their behavior, including substance use (Crowley, Mukulich, Ehlers, Whitmore, & Macdonald, 2001; Johnson & Mott, 2001). Third, it should be reiterated that these students attended a charter school with a very strong emphasis on targeting risk factors and improving academic achievement; thus, the student body may not be entirely representative of, nor the results completely generalizable to, other populations of Hispanic adolescents, for example, in public or private schools. Fourth, use of single-item outcomes is a potential limitation of the current study. Although the use of these single items is a common way of measuring lifetime use, the use of additional items with strong psychometric properties would be useful for future research. Fifth, past research has revealed complex relationships between substance use and cultural variation among Hispanics based on factors such as Hispanic subgroup, level of acculturation, nativity, and among immigrants, length of time in the United States (Alvarez, Jason, Olson, Ferrari, & Davis, 2007; de la Rosa, 2002; Vega, Gil, & Wagner, 2002). Moreover, contextual factors such as neighborhood crime appear to influence substance use among Hispanic youths differentially depending on the youth's level of acculturation (Kulis et al., 2007). Therefore, future research on adolescent substance use among Hispanics should seek to incorporate measures of cultural variation where possible. Finally, although not necessarily a limitation, it should be noted that the present findings do not provide evidence for longitudinal or causal hypotheses about the effects of aggression subtypes and neighborhood violence on later substance use; in this regard, further research is needed.

## Conclusions

In sum, research has consistently demonstrated a unique association between proactive (not reactive) aggression and alcohol use for both males and females, and this link has been found in samples comprised of individuals from various racial and ethnic groups, including Hispanic youths in the present study (Connor et al., 2003; Fite et al., 2007; Fite et al., 2008; Fite et al., 2010; Miller & Lynam, 2006; Pulkkinen, 1996). Thus,

it seems that reactive aggression is not a risk factor for early alcohol use for youths. Rather, proactively aggressive behavior needs to be targeted for the prevention of alcohol use across individuals. In addition, although there may be particular situations in which reactive aggression is a risk factor for early tobacco and marijuana use, proactive aggression appears to be more strongly associated with early use of these substances. These findings further suggest the need to specifically target proactively aggressive behavior for the prevention of early substance use. Finally, the impact of proactive aggression on substance use appears to be independent of neighborhood violence, indicating the need to target proactively aggressive youths regardless of the level of perceived violence in the neighborhood.

Current findings also suggest that both individual (i.e., proactive aggression) and contextual (i.e., neighborhood violence) factors are contributing to risk for early use of tobacco and marijuana, and therefore prevention and intervention programs need to include strategies that will have an effect on both factors. For example, the Coping Power Program is structured after a contextual social-cognitive model of child aggression, which emphasizes the importance of individual decision-making ability of the child as well as the role of the immediate (i.e., parenting) and larger (i.e., neighborhood) contextual environment in the development of problem behavior (Lochman & Wells, 2002; Lochman, Wells, & Murray, 2007). Indeed, this program has been found to reduce risk of early substance use in aggressive elementary school-age children (Lochman & Wells, 2002; Lochman et al., 2007). “Keepin’ it REAL” is a culturally grounded substance use prevention program that takes into account neighborhood and other contextual influences that contribute to substance use decisions. This program has also been found to help reduce risk for substance use, including in samples of Latino middle school students (Kulis et al., 2007). Thus, these types of programs may also be beneficial for reducing risk for adolescent substance use from a variety of ethnic and cultural backgrounds. Future research that continues to incorporate and evaluate multiple targets of intervention will be important to further improve early use prevention and treatment.

## REFERENCES

- Acton, G. S. (2003). Measurement of impulsivity in a hierarchical model of personality traits: Implications for substance use. *Substance Use & Misuse, 38*, 67–83.
- Alvarez, J., Jason, L. A., Olson, B. D., Ferrari, J. R., & Davis, M. I. (2007). Substance abuse prevalence and treatment among Latinos and Latinas. *Journal of Ethnicity in Substance Abuse, 6*(2), 115–141.



- Aneshensel, C. S., & Sucoff, C. A. (1996). The neighborhood context of adolescent mental health. *Journal of Health and Social Behavior*, 37, 293–310.
- Barry, T. D., Lochman, J. E., Fite, P. J., Wells, K. C., & Colder, C. R. (2012). The influence of neighborhood characteristics and parenting practices on academic problems and aggression outcomes among moderately to highly aggressive children. *Journal of Community Psychology*, 40(3), 372–379.
- Brody, G. H., Ge, X., Kim, S. Y., Murray, B. M., Simons, R. L., Gibbons, F. X., . . . Conger, R. D. (2003). Neighborhood disadvantage moderates associations of parenting and older sibling problem attitudes and behavior with conduct disorders in African American children. *Journal of Consulting and Clinical Psychology*, 71, 211–222.
- Bronfenbrenner, U. (1979). *The ecology of human development*. Cambridge, MA: Harvard University Press.
- Bronfenbrenner, U., & Evans, G. W. (2000). Developmental science in the 21st century: Emerging questions, theoretical models, research designs and empirical findings. *Social Development*, 9, 115–125.
- Buka, S. L., Stichick, T. L., Birdthistle, I., & Earls, F. J. (2001). Youth exposure to violence: Prevalence, risks, and consequences. *American Journal of Orthopsychiatry*, 71(3), 298–310.
- Colder, C. R., Lengua, L. J., Fite, P. J., Mott, J. A., & Bush, N. R. (2006). Temperament in context: Infant temperament moderates the relationship between perceived neighborhood quality and behavior problems. *Journal of Applied Developmental Psychology*, 27, 456–467.
- Connor, D. F., Steingard, R. J., Anderson, J. J., & Melloni, R. H. (2003). Gender differences in reactive and proactive aggression. *Child Psychiatry and Human Development*, 33(4), 279–294.
- Crowley, T. J., Mukulich, S. K., Ehlers, K. M., Whitmore, E. A., & Macdonald, M. J. (2001). Validity of structured clinical evaluations in adolescents with conduct and substance problems. *Journal of the American Academy of Child and Adolescent Psychiatry*, 40, 265–273.
- de la Rosa, M. (2002). Acculturation and Latino adolescents' substance use: A research agenda for the future. *Substance Use and Misuse*, 37(4), 429–456.
- Dodge, K. A., & Coie, J. D. (1987). Social information-processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology*, 53, 1146–1158.
- Dodge, K. A., Lochman, J. E., Harnish, J. D., Bates, J. E., & Pettit, G. S. (1997). Reactive and proactive aggression in school children and psychiatrically impaired chronically assaultive youth. *Journal of Abnormal Psychology*, 106, 37–51.
- Ellickson, P. L., Tucker, J. S., Klein, D. J., & Saner, H. (2004). Antecedents and outcomes of marijuana use initiation during adolescence. *Preventative Medicine: An International Journal Devoted to Practice and Theory*, 39(5), 976–984.
- Ennett, S. T., Ringwalt, C. L., Thorne, J., Rohrbach, L. A., Vincus, A., Simons-Rudolph, A., & Jones, S. (2003). A comparison of current practice in school-based substance use prevention programs with meta-analysis findings. *Prevention Science*, 4, 1–14.
- Ennett, S. T., Rosenbaum, D. P., Flewelling, R. L., Biehler, G. S., Ringwalt, C. L., & Bailey, S. L. (1994). Long-term evaluation of drug abuse resistance education. *Addictive Behaviors*, 19, 113–125.
- Fite, P. J., Colder, C. R., Lochman, J. E., & Wells, K. C. (2007). Pathways from proactive and reactive aggression to substance use. *Psychology of Addictive Behaviors*, 21(3), 355–364.
- Fite, P. J., Colder, C. R., Lochman, J. E., & Wells, K. C. (2008). The relation between childhood proactive and reactive aggression and substance use initiation. *Journal of Abnormal Child Psychology*, 36(2), 261–271.
- Fite, P. J., Colder, C. R., & Pelham, W. (2006). A factor analytic approach to distinguishing pure and co-occurring dimensions of proactive and reactive aggression. *Journal of Clinical Child and Adolescent Psychology*, 35, 578–582.
- Fite, P. J., Raine, A., Stouthamer-Loeber, M., Loeber, R., & Pardini, D. A. (2010). Reactive and proactive aggression in adolescent males: Examining differential outcomes 10 years later in early adulthood. *Criminal Justice and Behavior*, 37, 141–157.
- Fite, P. J., Schwartz, S., & Hendrickson, M. (2012). Childhood proactive and reactive aggression: Differential risk for substance use? *Aggression and Violent Behavior*, 17, 240–246.
- Gorman-Smith, D., & Tolan, P. (1998). The role of exposure to community violence and developmental problems among inner-city youth. *Development and Psychopathology*, 10, 101–116.
- Jacobsen, L. K., Krystal, J. H., Menci, W. E., Westerveld, M., Frost, S. J., & Pugh, K. R. (2005). Effects of smoking and smoking abstinence on cognition in adolescent tobacco smokers. *Biological Psychiatry*, 57, 56–66.
- Johnson, T. P., & Mott, J. A. (2001). The reliability of self-reported age of onset of tobacco, alcohol and illicit drug use. *Addiction*, 96, 1187–1198.
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2011). *Monitoring the Future national results on adolescent drug use: Overview of key findings, 2010*. Ann Arbor, MI: Institute for Social Research, The University of Michigan.
- Kilpatrick, D. G., Acierno, R., Saunders, B., Resnick, H. S., Best, C. L., & Schnurr, P. P. (2000). Risk factors for adolescent substance abuse and dependence: Data from a national sample. *Journal of Consulting and Clinical Psychology*, 68(1), 19–30.
- King, S. M., Iacono, W., & McGue, M. (2004). Childhood externalizing and internalizing psychopathology in the prediction of early substance use. *Addiction*, 99, 1548–1559.
- Kulis, S., Marsiglia, F. F., Sicotte, D., & Nieri, T. (2007). Neighborhood effects on youth substance use in a southwestern city. *Sociological Perspectives*, 50(2), 273–301.
- Little, T. D., Henrich, C. C., Jones, S. M., & Hawley, P. H. (2003). Disentangling the “whys” from the “whats” of aggressive behavior. *International Journal of Behavioral Development*, 27, 122–133.
- Lochman, J. E., & Wells, K. C. (2002). The Coping Power Program at the middle school transition: Universal and indicated prevention effects. *Psychology of Addictive Behaviors*, 16, S40–S54.
- Lochman, J. E., Wells, K. C., & Murray, M. (2007). The Coping program: Prevention intervention at the middle school transition. In P. Tolan, J. Szapocznik, & S. Sambrano (Eds.), *Preventing youth substance abuse: Science-based programs for children and adolescents* (pp. 185–210). Washington, DC: American Psychological Association.
- Lynam, D. R., Caspi, A., Moffit, T. E., Wikstroem, P. O., Loeber, R., & Novak, S. (2000). The interaction between impulsivity and neighborhood context on offending: The effects of impulsivity are stronger in poorer neighborhoods. *Journal of Abnormal Psychology*, 109, 563–574.
- Miller, J. D., & Lynam, D. R. (2006). Reactive and proactive aggression: Similarities and differences. *Personality and Individual Differences*, 41(8), 1469–1480.
- Miller, T. L. (2004). The social costs of adolescent problem behavior. In A. Biglan, P. A. Brennan, S. L. Foster, H. D. Holder, T. L. Miller, & P. B. Cunningham (Eds.), *Helping adolescents at risk: Preventions of multiple problem behaviors* (pp. 31–56). New York, NY: Guilford Press.
- Moeller, F. G., & Dougherty, D. M. (2002). Impulsivity and substance abuse: What is the connection? *Addictive Disorders and Their Treatment*, 1, 3–10.
- Moffit, T. E. (2003). Life-course-persistent and adolescent-limited antisocial behavior: A 10-year research review and a research agenda. In B. B. Lahey, T. E. Moffitt, & A. Caspi (Eds.), *Causes of conduct disorder and juvenile delinquency* (pp. 50–75). New York, NY: Guilford Press.

- Muthén, B. O. (1984). A general structural equation model with dichotomous, ordered categorical and continuous latent variable indicators. *Psychometrika*, *49*, 115–132.
- National Research Council. (2004). *Reducing underage drinking: A collective responsibility*. Washington, DC: National Academies Press.
- Overstreet, S., & Braun, S. (2000). Exposure to community violence and post-traumatic stress symptoms: Mediating factors. *American Journal of Orthopsychiatry*, *70*(2), 263–271.
- Pardini, D., Lochman, J., & Wells, K. (2004). Negative emotions and alcohol use initiation in high-risk boys: The moderating effect of good inhibitory control. *Journal of Abnormal Child Psychology*, *32*, 505–518.
- Partnership at Drug Free.org. (2012). *The Partnership Attitude Tracking Study: 2011 parents and teens full report*. Retrieved from <http://www.drugfree.org/wp-content/uploads/2012/05/PATS-FULL-Report-FINAL-May-2-PDF-.pdf>
- Pulkkinen, L. (1996). Proactive and reactive aggression in early adolescence as precursors to anti- and prosocial behavior in young adults. *Aggressive Behavior*, *22*(4), 241–257. doi: 10.1002/(SICI)1098-2337(1996)22:4b241::AID-AB1>3.0.CO;2-O
- Raine, A., Dodge, K. A., Loeber, R., Gatzke-Kopp, L., Lynam, D., Reynolds, C., ... Liu, J. (2006). The reactive-proactive aggression questionnaire: Differential correlates of reactive and proactive aggression in adolescent boys. *Aggressive Behavior*, *32*, 159–171.
- Sampson, R. J., Raudenbush, S. W., & Earls, F. (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science*, *277*, 918–924.
- SAS. (2010). *SAS 9.3 statistical software*. Cary, NC: SAS Institute Inc.
- Tucker, J. S., Ellickson, P. L., Orlando, M., Martino, S. C., & Klein, D. J. (2005). Substance use trajectories from early adolescence to emerging adulthood: A comparison of smoking, binge drinking, and marijuana use. *Journal of Drug Issues*, *35*(2), 307–332.
- Vega, W., Gil, A., & Wagner, E. (2002). Cultural adjustment and Hispanic adolescent drug use. In W. Vega, A. G. Gil, & Associates (Eds.), *Drug use and ethnicity in early adolescence. Longitudinal Research in the Social and Behavioral Sciences: An Interdisciplinary Series* (pp. 125–145). New York, NY: Kluwer.
- Vermeiren, R., Schwab-Stone, M., Deboutte, D., Leckman, P. E., & Ruchkin, V. (2003). Childhood and adolescent antecedents of drug and alcohol problems: A longitudinal study. *Pediatrics*, *111*(3), 535–540.
- Vitaro, F., & Brendgen, M. (2012). Subtypes of aggressive behaviors: Etiologies, development and consequences. In T. Bliesner, A. Beelman, & M. Stemmler (Eds.), *Antisocial behavior and crime: Contributions of theory and evaluation research to prevention and intervention*. Goettingen, Germany: Hogrefe.
- Vitaro, F., Gendreau, P. L., Tremblay, R. E., & Oligny, P. (1998). Reactive and proactive aggression differentially predict later conduct problems. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *39*(3), 377.
- Waldron, H. B., & Turner, C. W. (2008). Evidence-based psychosocial treatments for adolescent substance abuse. *Journal of Clinical Child & Adolescent Psychology*, *37*, 238–261.
- Wandersman, A., & Naton, M. (1998). Urban neighborhoods and mental health: Psychological contributions to understanding toxicity, resilience, and interventions. *American Psychologist*, *53*, 647–656.
- Waschbusch, D. A., Willoughby, M. T., & Pelham, W. E. (1998). Criterion validity and the utility of reactive and proactive aggression: Comparisons to attention deficit hyperactivity disorder, oppositional defiant disorder, and other measures of functioning. *Journal of Clinical Child Psychology*, *27*, 396–405.
- Winstanley, E. L., Steinwachs, D. M., Ensminger, M. E., Latkin, C. A., Stitzer, M. L., & Olsen, Y. (2008). The association of self-reported neighborhood disorganization and social capital with adolescent alcohol and drug use, dependence, and access to treatment. *Drug Alcohol Dependence*, *1*(92), 173–182.
- Yu, C. Y., & Muthén, B. O. (2001). *Evaluation of model fit indices for latent variable models with categorical and continuous outcomes*. [Technical report]. Los Angeles, CA: University of California, Los Angeles, Graduate School of Education and Information Studies.