

PROBING THE RELATIONSHIP BETWEEN VOLUNTEERING AND SUBSTANCE ABUSE
IN ADOLESCENCE: A TEST OF TWO EXPLANATIONS

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Introduction

While overall levels of adolescent civic engagement have declined since 1970 (Flanagan & Levine, 2010; Carnegie Corporation, 2003), there is one exception to this trend: volunteering. In fact, out of ten markers of citizenship, such as membership in formal organizations, political awareness, and voting, volunteering is the only activity in which adolescents today more actively participate than did their counterparts in 1970 (Flanagan & Levine, 2010). Between 1976 and 2001, the percent of youth who reported volunteering increased from about 63% to over 75%, and this rate has remained relatively constant over the past decade (Lopez, 2003; Marcelo, 2007). Furthermore, students entering college in the United States are more likely to report that they have volunteered than are their counterparts in 27 other countries (Torney-Purta, Lehmann, Oswald, & Shulz, 2001). Greater emphasis on community service in schools may partly explain this increase; a 2008 national survey of high school principals revealed that 68 percent of middle schools and 86 percent of high schools offered community service opportunities (Corporation for National and Community Service, 2008). Furthermore, volunteering has received political support with the passage of the Edward M. Kennedy Serve America Act, which took distinct measures to promote youth volunteerism (Edward M. Kennedy Serve America Act, 2009), including developing opportunities for adolescents to engage in a Summer of Service program, a semester of service-learning, and to participate in Youth Empowerment Zones.

As volunteering has emerged as the primary form of youth civic engagement and has gained support from school and political leadership, researchers have focused attention on its academic, social, and behavioral outcomes. A growing body of research has revealed that volunteering is predictive of reduced risk behavior, including teen pregnancy, school suspension, school drop-out, course failure (Moore & Allen, 1996), premature sexual initiation (Aspy et al., 2010), marijuana use (Youniss, Yates, & Su, 1997), arrest (Uggen & Janikula, 1999); and enhanced psychosocial wellbeing, including higher levels of self-esteem and life satisfaction

(King, Walder, & Pavey, 1970; Maton, 1990). Also, there is evidence that volunteering may predict better outcomes in late adolescence and early adulthood including greater odds of completing a 4-year college degree (Davila & Mora, 2007) and participating in political activities (Hanks, 1981; Verba et al., 1995; Niemi, Hepburn, & Chapman, 2000). Although many of these studies suffer from selection bias, several do employ randomized, longitudinal experiments and others take care to adjust for important confounding factors.

Researchers typically theorize that two distinct processes mediate the link between volunteering and positive outcomes. Although previous research has not typically employed these exact terms, the processes can generally be categorized in terms of *relational* factors and *psychosocial* factors. Adherents to the relational explanation and its derivations argue that volunteering facilitates positive outcomes by enhancing adolescent connections to peers, adults, and institutions associated with the norms of conventional society. These bonds to conventional society, in turn, deter risk behaviors and promote positive behaviors. Other researchers emphasize the mediating power of psychosocial factors, asserting that volunteering alters internal characteristics such as self-esteem, emotional well-being, and risk-taking disposition, and these internal characteristics thus result in desirable outcomes. However, few studies have empirically explored the pathways through which volunteering is protective against certain risk behaviors. Using a large, representative dataset, this article explores whether adolescent volunteering is protective against tobacco, marijuana, and alcohol use and whether this association is best explained by the relational explanation or the psychosocial explanation.

Literature Review

This literature review will first address the “black box” between volunteering and reduction of risk behavior by defining the meaning of volunteering in the present study and contextualizing the study in the Positive Youth Development (PYD) movement. It will then explore the relational explanation, how volunteering may enhance positive bonding to individuals

and institutions, and the psychosocial explanation, how volunteering may strengthen individual characteristics such as self-esteem, identity formation, and risk-taking disposition. Finally, it will provide a brief review of how these factors contribute to the reduction of substance abuse.

Volunteering Versus Other Types of Youth Civic Engagement

Before proceeding, it is important to be clear about how volunteering is defined in the present study. Respondents for the Monitoring the Future (MTF) survey were asked to note how frequently they participated in community affairs or volunteer work. The Innovation Center for Community and Youth Development distinguishes between volunteering, community service, and service-learning (Family Strengthening Policy Center, 2007). Volunteering is the most general of these terms, reflecting involvement in some type of charitable activity, including collecting and distributing food, tutoring younger children, and planting a community garden. Compared to volunteering, community service implies a more deliberate effort to effect community change through collaborative processes. Service-learning integrates community service with academic curriculum and focuses particular attention on academically oriented reflection. In addition to these three activities, youth also may be involved in youth organizing, which empowers young people to change their communities through challenging the status quo (e.g. Checkoway & Richards-Shuster, 2006); youth-led community research, which engages young people in collecting and analyzing data to solve community problems (e.g. Torre & Fine, 2006); and arts-based forms of community activism through mediums such as hip-hop and film (e.g. Jocson, 2006).

Westheimer and Kahne (2004) offer a useful distinction between different types of citizens, including the personally responsible citizen who may contribute to a food drive, the participatory citizen who may organize the food drive, and the justice-oriented citizen who may additionally explore the root causes of hunger. It is important to distinguish between different types of civic behavior, because they can each yield different outcomes (Keeter, 2002;

Westheimer & Kahne, 2004). Because the survey used in the present study does not ask students to report exactly how they are involved in the community, this literature review seeks to understand the effects of volunteering at its most basic level, simply participating in some type of charitable activity. However, effects of service-learning will be discussed in cases where there is little existing research on effects of basic volunteering. The reader should be aware, however, that respondents may actually be involved in any of the civic activities mentioned above.

Volunteering and Positive Youth Development

The notion that volunteering can reduce risk behavior falls in line with the Positive Youth Development (PYD) field, whose oft-cited mantra is “problem-free is not fully prepared” (Pittman, 1991). Thus, although the two disciplines share several similarities, PYD has departed from prevention science by offering youth opportunities that aim to develop their strengths rather than reduce their deficits. Furthermore, PYD calls special attention to mobilizing youth as community resources through community service (Catalano et al., 2002). Although the most effective interventions aimed at reducing risk behavior likely interweave elements from both PYD and prevention science (Catalano et al., 2002), fewer studies have considered the impact of maximizing the strengths of young people compared to the impact of simply removing youth from high-risk situations.

The developmental assets framework has become a useful way to empirically test the effect of youth assets on risk behavior. The Search Institute derived 40 assets from a synthesis of many years of research on the internal strengths (e.g. social competencies, positive values, commitment to learning, and positive identity) and external strengths (e.g. support, empowerment, boundaries and expectations, and constructive use of time) that have been shown to result in positive outcomes. Using this framework, Leffert and colleagues (1998) surveyed nearly 100,000 youth in 213 U.S. cities and towns and discovered a direct relationship between

the number of developmental assets present among youth and likelihood of alcohol use, depression, and violence.

Service to others is one of many of the developmental assets that is worthy of consideration for its potential to trigger the formation of other assets. For example, volunteering may catalyze many of the other 39 assets such as positive family communication, adult role models, positive peer influence, bonding to school, interpersonal competence, personal power, and self-esteem, each of which will be explored further in the following sections of this review. The influence of volunteering on other aspects of development was illustrated by Eccles and Barber (1999), who used data from the Michigan Study of Adolescent Life Transitions to explore how integration in constructive leisure activities influences alcohol and drug use, skipping school, and liking school. Examining the influence of five types of involvement – pro-social, team sports, student government or pep club, performing arts, and academic clubs – on risky behavior, the authors found that pro-social involvement, which includes volunteering, is the only activity that significantly predicted each of the four outcomes under investigation. These findings were maintained even after controlling for demographic and family variables. This study thus suggests that volunteering may offer greater benefits than other types of organized activities and deserves unique attention as a strategy to prevent risk behavior. Researchers who have investigated the specific contributions of volunteering have discussed potential mediators in terms of the relational explanation and/or the psychosocial explanation, both of which align to the external and internal developmental assets. A discussion of each of these explanations follows.

The Relational Explanation

Several researchers have employed variations of Criminologist Travis Hirschi's (1969) social control theory (SCT) to explain the effect of volunteering on risk reduction. Hirschi (1969) argued that youth who maintain strong bonds to various social dimensions – peers, family, and institutions such as school and church – would be less prone to delinquency. Despite strong

empirical support for this model (Hindelang, 1973), SCT has been widely criticized for not explaining the nature by which these bonds develop and neglecting the fact that strong bonds to delinquent peers or family members may magnify delinquency (Haynie, 2001). Social learning theory (SLT) amended SCT, positing that people adapt behaviors modeled by those in their environment (Bandura, 1977), particularly when these behaviors are rewarded. Several scholars have employed elements of SLT to explain how delinquent peers influence adolescent behavior (Sutherland 1947; Burgess & Akers, 1966). The social developmental model (SDM) combined SLT and SCT, also identifying peers, family, and school as important influences on youth pro-social behavior (Catalano & Hawkins, 1996) but extending the models to further consider the specific mechanisms through which positive attachments develop. The model assumed that opportunities for involvement, skills, and reinforcements determine whether exposure to peers, family, and institutions will result in attachment, commitment, and belief in conventional society. Thus the term, *relational explanation*, in this article includes elements of social control theory, social learning theory, and the social developmental model.

Hawkins and Weis (1985) note that interventions rooted in the social development model should not attempt to change individual attitudes and behaviors, but rather, offer opportunities for strong involvement, develop skills for successful participation, and consistently reinforce positive behavior. Volunteering may provide these opportunities for involvement, skill-building, and reinforcements, hence resulting in greater attachment to 1) pro-social peers, 2) family, 3) supportive adults, and 4) school, and this heightened attachment may thus prevent risk behavior. First, volunteering may lead to attachment to pro-social peers in situations where youth volunteer in groups or alone. Group volunteering may offer youth a tight-knit group of pro-social peers who reinforce and support one another's positive development as they engage in a unique experience together (Dworkin, Larson, & Hansen, 2003; Pearce & Larson, 2006). Sociologists Berger and Luckmann (1966) proposed that as individuals assimilate into a group, they adapt and internalize the group's norms. For example, Pearce and Larson (2006) interviewed participants in a youth

action program who reported that a welcoming and supportive peer group created a sense of collectivity and shared experience, which heightened their engagement in the goals of the program. In addition to helping youth feel less isolated (Calabrese & Schumer, 1986), making new friends through activities such as volunteering may offer adolescents the opportunity to move fluidly between multiple peer groups (Dworkin, Larson, & Hansen, 2003), quelling the influence of a group that engages in high-risk behaviors. Although other extracurricular activities could enable this fluidity, volunteering may have an especially strong effect on peer relations because the basis of the peer group formation surrounds an explicitly pro-social activity. Even volunteering individually could facilitate more positive attachment to one's peer group, as youth become more comfortable assuming different roles and positions within their peer group (Usher, 1977).

Volunteering also has the potential to strengthen ties between youth and their families. Using the National Household Educational Survey, Niemi, Hepburn, & Chapman (2000) suggested a link between volunteering and family contact, revealing that adolescents who do community service are significantly more likely to talk to their parents about the news at least once a week. Furthermore, Scales et al. (2000) revealed that among a sample of over 1,000 socioeconomically and racially diverse middle schools students, students who were randomly assigned to participate in service-learning activities reported talking to their parents more frequently in the post-test than non-participants. Interestingly, this finding was significant for girls but not for boys. Perhaps by participating in activities that promote adult-like behavior, autonomy, and exposure to injustice, youth are able and wanting to relate to their parents on a more advanced and mature level (Niemi, Hepburn, & Chapman, 2000).

Several studies have suggested that volunteering establishes contact with supportive and normative non-family adults (Allen, Philliber, & Hoggson, 1990; Scales, Blyth, Burkas, & Kielsmeier, 2000; Scales, Benson, & Mannes, 2003; Watts & Flanagan, 2007). Scales, Benson, and Mannes (2003), for example, suggested that youth who participate in organized activities not

only benefit from more contact with supportive adults, but additionally benefit from more enriching types of contact. Using longitudinal data spanning from middle school to high school, they found a positive association between youth participation in organized activities and connections to non-family adults. Furthermore, these connections predicted greater assets, such as sense of empowerment and sense of adult expectations, and fewer risk behaviors, such as problem alcohol use, antisocial behavior, and violence. After controlling for connections with non-family adults, simply participating in organized activities no longer predicted desired outcomes, suggesting the salience of non-family adults as a mediator. Whether or not exposure to supportive adults through civic involvement can compensate for family detachment is unclear. An analysis of data from the Health Behavior of School-Aged Children Study in one region of Italy did not support this hypothesis (Vieno, Nation, Perkins, & Santinello, 2007).

In addition to considering attachment to individuals, social control theory and its more recent derivations also consider attachment to institutions. Although service-learning is more intentional about academic, interpersonal, and civic outcomes than traditional community service, the service-learning literature contains abundant evidence that service-learning impacts school attachment and commitment. Service-learning respondents in the Growing to Greatness survey were much more likely to describe themselves as being very or extremely satisfied with school than young people not engaged in community service (Family Strengthening Policy Center, 2007). Billig (2005) compared outcomes of students in five high schools with service-learning programs against five control schools without service-learning programs. Students who were actively engaged in service-learning reported a host of better outcomes, including academic engagement, valuing school, and enjoyment of math, science, reading, and social studies. Among a sample of 1,153 middle school students from three schools in three various states, Scales et al. (2000) found that students randomly assigned to service-learning programs reported greater levels of academic motivation. Furthermore, a study on service-learning revealed that 68 percent of service-learning sites reported a decrease in discipline referrals (Follman & Muldoon, 1997), a

pattern that was more significant at schools with at-risk youth, and that 62 percent of the schools demonstrated an increase in attendance, potentially revealing a sense of greater connectedness to school.

The Psychosocial Explanation

Studies on volunteering have frequently examined the impact of community service on psychosocial characteristics, such as positive identity formation, emotional well-being, self-esteem, and risk-taking disposition. While many of these studies acknowledged that positive connections with individuals and institutions facilitate the development of these characteristics, they framed the direct cause of the relationship between volunteering and behavior in terms of psychosocial factors rather than relational factors.

Positive identity. Positive identity can be operationalized as having a sense of purpose, control over one's life, and a positive view of one's future (Search Institute, 2003). In line with the Positive Youth Development (PYD) movement, several researchers have posited that volunteering strengthens positive identity development, and this heightened sense of identity diminishes one's propensity toward risky behavior (Youniss & Yates, 1999; Hansen, Larson, & Dworkin, 2003; McIntosh, Metz, & Youniss, 2005). As Watts and Flanagan (2007) observed, as adolescents build their value system, they look for alignment between their views and those of individuals, organizations, and groups. Volunteering can expose youth to individuals and organizations with a consistent and positive value system. Youniss and Yates (1999) further discussed how volunteering helps youth develop positive identities. Recounting a service-learning program in an inner-city school system, the authors argued that service helps youth build core moral identities: "Seeing that they can actually help homeless hungry people, and then possibly projecting themselves as having skills and responsibilities for addressing social ill, youth have taken a large step toward incorporating morality into their identities" (p. 372). Concomitantly, youth participants in the study reported perceiving themselves as better people after volunteering.

Similarly, youth involved in service at one ethnically diverse high school reported higher scores on scales dealing with exploration, reflection, and emotional regulation than students involved in other types of activities (Hansen, Larson, & Dworkin, 2003). In a longitudinal study of 173 students in one high school, McIntosh, Metz, and Youniss (2005) found that students who reported higher levels of engagement in community service also scored higher on a measure of identity clarity. Furthermore, comparing all students who scored highly on identity clarity at the beginning of high school, those who more frequently participated in community service had greater gains in identity clarity over the course of high school. However, youth with low identity clarity scores at the beginning of high school did not make significant gains through community service participation.

Emotional Well-Being. There is some empirical support for the popular idea that volunteering “makes you feel good.” Although their sample consisted of adults, Thoits and Hewitt (2001) found that more hours of volunteer work corresponded with significantly greater happiness, life satisfaction, self-esteem, and sense of mastery, even after controlling for prior levels of personal well-being and membership in other voluntary groups. The authors explained their finding by positing that volunteering makes people feel important, as if they matter, and that it facilitates development of a role-identity that provides meaning and importance in life. Similarly, in their evaluation of the Teen Outreach program for disadvantaged youth, Allen, Philliber, and Hoggson (1990) used the “helper-therapy” principle to explain their finding that rates of school drop-out, suspension, and pregnancy are lower at sites where the program’s volunteer component is greater. Riessman’s (1965) “helper-therapy” principle suggested that helping others may be therapeutic and lead to personal growth, particularly for those in marginalized groups. Another study, though limited by its small sample size, revealed that among 50 ninth-grade students, those who participated in community service reported lower feelings of isolation and alienation from pre- to post-test than their peers in the control group (Calabrese and Schumer, 1986).

Self-esteem and self-efficacy. Empirically, evidence supporting the relationship between volunteering and self-esteem is mixed. Scales et al. (2000) found that among a sample of over 1,000 middle school students, half of whom were randomly assigned to participate in service-learning, students in the experimental group reported higher levels of perceived efficacy to help others. Additionally, in their large-scale evaluation of high school community service programs, Newmann and Rutter (1983) revealed that students who participated in community service programs increased more than comparison students in markers of perceived self-competence, such as communicating effectively to groups, persuading adults to take their views seriously, and starting conversations with strangers. An evaluation of the Young Volunteers in ACTION program revealed a significant gain in self-esteem among the 300 participants, ages 14-22, from pre- to post-test (ACTION, 1986). Additionally, comparison of gains in self-esteem from pre to post-test between an experimental and control group revealed significant increases for urban high school students engaged in community service (Luchs, 1981). However, several quantitative studies found no relationship between volunteering and self-esteem development (Cohen, Kulik, & Kulik, 1982; Crosman, 1989; Johnson & Notah, 1999). A quasi-experimental evaluation of a middle-level service program revealed an increase in self-esteem for boys but not for girls (Switzer et al., 1995), suggesting that certain groups may gain more self-esteem through volunteering than others.

Risk-taking disposition. Although the author is not aware of any studies that have directly tested the relationship between volunteering and risk-taking disposition, there is evidence that organized activities help youth develop their probabilistic thinking and responsibility. Heath (1997, 1999) studied linguistic changes among youth in organized activities and found a significant increase in the use of “if...then” sentences. They developed a greater ability to weigh pros and cons of certain actions and rationally consider consequence. Regarding responsibility, another study revealed that 95 percent of organizations that engaged youth volunteers through a

program in one New Jersey high school agreed that the volunteers had become more responsible over the course of time (Harrison, 1987).

The Two Explanations and Substance Abuse

This study examines substance abuse as a dependent variable for two reasons. First, substance abuse prevention and intervention are desirable goals for the well-being of adolescents and society at large. Drug and alcohol abuse can undermine motivation, contribute to mood disorders, increase risk of injury or death, and present society with high costs in health care, educational failure, drug and alcohol treatment, and juvenile crime (Hawkins, Catalano, & Miller, 1992). Furthermore, 80 to 90 percent of smokers report starting to smoke before they turned 18 years old, suggesting that adolescence is a critical period for prevention of the many adverse and potentially fatal effects of smoking (Substance Abuse and Mental Health Service Administration, 2008). Second, the conceptual frameworks researchers often use to explain adolescent substance abuse frequently overlap with the conceptual frameworks often used to explain the beneficial outcomes associated with volunteering. That is, many studies on adolescent substance abuse also employ either a relational explanation or psychosocial explanation to understand how youth choose whether or not to engage in substance abuse.

Using the relational framework, peers and family members have a strong influence on substance use behavior. There is bountiful evidence that association with drug using peers is among the strongest predictors of substance abuse among youth, surpassing even the influence of family (Hawkins, Catalano, & Miller, 1992; Mounts & Steinberg, 1995). Along with relational theory, other popular theories have backed this evidence. For example, Differential Association Theory (Sutherland, 1947) attributed juvenile delinquency in large part to association with delinquent peers, and Reintegrative Shaming Theory (Braithwaite, 1989) posited that youth who exhibit problem behaviors can reintegrate into normative society through engaging in pro-social activity, such as volunteering alongside conforming peers. Although most adolescents reject the

notion of direct “peer pressure,” many still cite peer influence as the reason they began smoking (Arnett, 2007). While researchers frequently consider peer behavior as the most potent factor, “peer influence” can be operationalized in several ways. One study found that peer approval of substance abuse was the third most important predictor of individual use, just behind actual peer use and parent approval (Kristjansson, 2010). There is also evidence that the percentage of students in a classroom or school who smoke can influence individual smoking behavior, suggesting that the saliency of peer influence extends beyond the immediate peer group (Sellstrom & Bremberg, 2006; Ennett et al., 2008; Ali & Dwyer, 2009). Although the predictive power of peer versus family attachment on substance abuse is disputed, in their extensive literature review on the subject, Hawkins and colleagues (1992) cited several studies regarding the protective effect of positive family relationships, defined by commitment, attachment, involvement, warmth, and trust.

Hawkins and colleagues (1992) further cited several studies whose results revealed that commitment to school, operationalized by expectations to attend college, liking school, time spent on homework, and good grades, was inversely related to substance abuse. A landmark longitudinal study with a randomized sample of over 25,000 7th to 12th graders revealed that a youth’s sense of school connectedness was one of the most significant protective factors against risky behaviors, such as early sexual debut and drug and alcohol abuse (Resnick et al, 1997). Another study of over 10,000 ninth and twelfth grade students revealed that low school connectedness was one of the largest predictors of substance abuse (Neumark-Sztainer, Story, French, & Resnick, 1997). However, these effects may depend on the type of substance and demographic factors. For example, one large, longitudinal study found that school bonding was associated with cigarette use but not alcohol use and that this effect was stronger for students with poor academic achievement (Bryant, 2003).

There is conflicting evidence that emotional well-being is associated with adolescent substance abuse. Some researchers have identified substance abuse as a function of tension

reduction theory (Conger, 1956), positing that adolescents use substances to escape from negative emotional states (Wills & Shiffman, 1985; Cooper et al., 1992), a theory that was upheld in a longitudinal study of urban adolescents (Wills, 1986). Another study found a significant association between perceived life satisfaction and substance abuse among a large, diverse, and random sample of high school students (Zillig et al., 2001). However, emotional well-being had no significant relationship with substance abuse among a national, representative sample of twelfth grade students (Neumark-Sztainer, Story, French, & Resnick, 1997). Again, the relationship between emotional well-being and substance abuse may vary depending on the dependent variable and the operationalization of emotional well-being. For example, one longitudinal study found that loneliness was predictive of alcohol use but not tobacco use (Bryant, 2003). Another study found that stress, as opposed to other types of emotional distress, was the most frequently cited reason for smoking initiation among 16-17 year old girls (Arnett, 2007).

There is also conflicting evidence on the effect of self-esteem on substance abuse. Analysis of data from the National Longitudinal Study of Adolescent Health revealed that self-esteem did predict highly significantly lower rates of cigarette, alcohol, and marijuana use for ninth through twelfth graders (Resnick et al., 1997). Another study with a large representative sample of sixth, ninth, and twelfth graders revealed that for twelfth grade students, self-esteem was significantly associated with substance abuse, although it was the weakest predictor in the model (Neumark-Sztainer, Story, French, & Resnick, 1997). Many studies have found that risk-taking disposition is an important predictor of adolescent substance abuse (Luengo, Carrillo-de-la-Pena, Otero, & Romero, 1994; Markey et al., 2006; Neumark-Sztainer, Story, French, & Resnick, 1997). In fact, a study of over 500 Australian adolescents revealed that the main reason for initial use of drugs was to try something new, a reason that youth cited 72 percent of the time (Spooner, Flaherty, & Homel, 1992).

Summary and Hypotheses

Thus research has revealed that volunteering can contribute to the development of young people who are not only “problem-free” but also “fully prepared” (Pittman, 1991). There is evidence that young people who volunteer have positive connections to peers, families, and school, as well as strong emotional well-being and decision-making abilities. Although studies have linked volunteering with each of these outcomes, studies have uncovered slightly less ambiguous evidence regarding the association between volunteering and strong bonds to peers, family, and institutions, compared to studies examining the influence of volunteering on emotional well-being and risk-taking disposition. Furthermore, the relational explanation seems to be a more salient predictor of substance abuse among adolescents. However, this body of literature is weakened by several shortcomings. Many studies testing whether volunteering results in attachment to individuals and institutions have utilized small samples and qualitative methods, which despite greatly contributing to the literature, have been unable to establish external validity. Furthermore, several studies have investigated service-learning rather than basic volunteering. Service-learning, which links service to curriculum, may offer a more meaningful experience than traditional volunteering, but considering that many more young people engage in the latter, there is merit to understanding the outcomes associated with basic volunteering.

Therefore, the purpose of this study is to further explore the relationship between volunteering and risk behavior using a large representative sample of high school seniors. To this end, it explores several research questions: Is there a relationship between volunteering and reduced substance abuse in adolescence? If so, what is the causal mechanism for this relationship? Finally, is a greater dosage of volunteering associated with proportional reductions in substance abuse? Consistent with other studies that have found a relationship between volunteering and reduction in risk behavior (Moore & Allen, 1996; Youniss, Yates, & Su, 1997; Uggen & Janikula, 1999; Aspy et al., 2010), this study hypothesizes that volunteering will be significantly associated with lower levels of tobacco, marijuana, and alcohol use. Additionally,

considering lesser ambiguity in studies adapting the relational explanation, this study posits that the relationship between volunteering and substance abuse will be better explained by variables adhering to the relational explanation (peer, family, and school attachment) than the psychosocial explanation (self-esteem, emotional well-being, and risk-taking disposition). Finally, this study will explore whether a particular dosage of volunteering is associated with stronger outcomes; for example, do students who volunteer more experience more positive outcomes? Thus far, there is no conclusive evidence that this is the case (see Allen, Kuperminc, Philliber, & Herre, 1994; Davila & Mora, 2007); therefore, this question is simply exploratory and no formal hypothesis was made.

Data and Sample

This study is a secondary data analysis of the annual Monitoring the Future (Johnston, O'Malley, & Bachman, 2007) survey of high school seniors which has been completed in a representative sample of about 133 public and private high schools each spring since 1975. The sample is selected through a three-stage process, whereby the researchers select particular geographic areas, then select particular schools, and finally, sample classrooms within those schools (www.monitoringthefuture.org). The MTF survey contains about 1,300 items, which assess self-reported substance abuse, demographic information, and attitudes and values. Students take about 45 minutes to complete the survey during the school day. The present sample consists of 9,829 cases derived from Form 7 of the survey from 2006-2009. There were no significant differences in rates of volunteering or substance abuse among different cohorts. The sample is 68.4 percent White, 13.8 percent Black, 17.8 percent Hispanic, and 47.6 percent male and 52.3 percent female. The overall response rate was about 80 percent.

Measures

Independent and Dependent Variables

Volunteering. Volunteering was measured by the single item, “How often do you participate in community affairs or volunteer work?” Responses were categorized as *1=never, 2=a few times a year, 3=once or twice a month, 4=once a week or more.*

Alcohol and marijuana use. Marijuana and alcohol use were each measured by asking students how often they drank more than just a few sips of alcohol and smoked marijuana in the *last 30 days*. Each variable originally contained seven response categories, including *Never, 1-2 times, 3-5 times, 6-9 times, 10-19 times, 20-39 times, and 40+ times*. It was necessary to recode these variables for several reasons. First, cases were distributed disproportionately across response categories. For example, an overwhelming percentage of youth had never used marijuana or alcohol, and very few had used these substances at the highest frequency levels. The response distributions for alcohol and marijuana use violate the requirement of 30-50 cases per variable for maximum likelihood estimation (Hart & Clark, 1999), rendering multinomial regression inefficient. This requirement could only be satisfied by collapsing response categories or by performing binomial logistic regression, but the former can inflate standard errors (Agresti & Finlay, 2009) and the latter can produce vastly different results depending on where the variable is dichotomized (MacCallum et al., 2002). Recoding the response categories as continuous numeric data (i.e. 1-7) was also not a preferred strategy because the response categories were not spaced at equal distances. Rather, the disproportionate rate of zeroes followed by a monotonic response pattern best fit a negative binomial distribution, which is used for overdispersed count data. Thus, data were recoded as numeric count data by calculating the midpoint of each response category: *Never=0; 1-2 times=1.5; 3-5 times=4; 6-9 times=7.5; 10-19 times=14; 20-39 times=29.5; 40+ times=40*. This strategy enabled preservation of the original response categories as well as meaningful distance between response category values.

Tobacco use. Tobacco use was measured by asking students how many cigarettes they smoked daily in the last 30 days. Each variable originally contained seven response categories, including *None*, *less than 1 cigarette per day*, *1-5 cigarettes per day*, *½ pack per day*, *1 pack per day*, *1 ½ packs per day*, and *2+ cigarettes per day*. Response categories were also converted to count data for the same reasons which pertained to alcohol and marijuana use. Thus recoded response categories reflect the number of cigarettes smoked in the past 30 days, assuming a pack contains 20 cigarettes: *None*=0; *less than 1 cigarette per day*=0.5, *1-5 cigarettes per day*=3, *½ pack per day*=10, *1 pack per day*=20, *1 ½ packs per day*=30, and *2+ cigarettes per day*=40.

Relational Variables

Peer approval of substance abuse. Peer acceptance was a factor comprised of three questions asking “How do you think your close friends feel (or would feel) about you doing...” various types of substances, including drinking 1-2 times a day, smoking cigarettes every day, and smoking marijuana regularly. Responses were coded numerically as 1=don’t disapprove, 2=disapprove, 3=strongly disapprove. ($\alpha=.83$)

Family support. Family support was measured by the item “How often do your parents (or stepparents or guardians) provide you with help with your homework when it’s needed?” Responses are coded numerically as 1=*never* and 4=*often*.

Family control. Family control was measured by the single item “How often do your parents (or stepparents or guardians) check to make sure you have done your homework?” Responses are coded numerically as 1=*never* and 4=*often*. Although several other questions solicited responses on family control, the Cronbach’s alpha was too low to combine these items into a single construct.

School attachment. School attachment was a factor comprised of two variables asking students over the past year how often they enjoyed being in school and how often they hated

being in school. Responses were coded numerically as 1=*never* and 5=*always* for the *enjoyed being in school* variable and are reverse coded for the *hated being in school* variable. ($\alpha=.73$)

Aspirations to attend college. College aspirations were measured through a series of questions asking “How likely is it that you will do each of the following after high school?” One of the response options was *Graduate from college (4-year program)*. Responses were coded numerically, with 1=*definitely won't* and 4=*definitely will*. Young people who aspire to graduate college can be perceived as having more commitment to a conventional life course, which is consistent with relational theory.

Psychosocial Variables

Emotional well-being. Emotional well-being was comprised of a twelve item scale which combines two sub-scales. There were eight items from the Rosenberg Self-Esteem Scale (Rosenberg, 1965) including items such as “On the whole I am satisfied with myself,” “I take a positive attitude toward myself,” “I am able to do things as well as most others,” and “I feel that I am a person worth, at least the equal of others.” There were four additional items from measuring happiness including items such as “Life often seems meaningless” and “It feels good to be alive.” Responses are coded numerically as 1=*disagree* and 5=*agree*. ($\alpha=.91$)

Risk-taking disposition. Risk-taking disposition was a 6-item scale. Four of these items were derived from the Brief Sensation Seeking Scale (Hoyle et al., 2002), which contains items such as “I like to do frightening things” and “I like new and exciting experiences, even if I have to break the rules.” Two of these items are derived from an adolescent thrill-seeking scale (Wood, Cochran, Pfefferbaum, & Arneklev, 1995) and include the items “I get a real kick out of doing things that are a little dangerous” and “I like to test myself every now and then by doing something a little risky.” Responses were coded numerically as 1=*disagree* and 5=*agree*. ($\alpha=.84$)

Control Variables

Demographic variables. Socioeconomic status was measured as the average of mother's and father's educational attainment. Responses were coded as 1=less than high school graduate, 2=high school graduate, 3=some college, 4=college degree, 5=graduate degree. Race was categorized as a factor with 0=White; 1=Black; and 2=Hispanic. MTF deleted all other cases from the study. Gender is categorized as a factor variable with 0=male and 1=female.

Religiosity. Religiosity was measured by two items, including, "How important is religion in your life?" and "How often do you attend religious services?" Each of these questions had four response categories that were averaged together with 4 representing the highest level of religiosity. ($\alpha=.76$). Studies have found that religious young people are more likely to volunteer (Youniss, McLellan, & Yates, 1999; Schmidt, Shumow, & Kackar, 2007) and to refrain from substance abuse (Hawkins, Catalano, & Miller, 1992; Neumark-Sztainer, Story, French, & Resnick, 1997).

Academic grades. Grades were measured with the question "Which of the following best describes your average grade so far in school?" Responses were coded numerically, with 1=D and 9=A. Students with higher GPAs are more likely to volunteer (Metz & Youniss, 2003; Corporation for National & Community Service, 2006), and school failure is associated with higher levels of substance abuse (Hawkins, Catalano, & Miller, 1992).

Extracurricular activities. Participation in extracurricular activities was constructed by items asking how often youth participate in school newspaper, student council, an academic club, music or drama, and other on a scale from 1=not at all to 5=a great extent. Scores were averaged across the five categories of activities. A large body of literature argues that participation in extracurricular activities prevents risk behavior (Battistich & Hom, 1997; Eccles & Barber, 1999).

Analytic Strategy

Before conducting analysis, problems with missing data were addressed. Because of the large number of variables examined in this study, listwise deletion would have severely reduced the sample size by about 50%. Thus multiple imputation was performed through the Multiple Imputation by Chained Equations (MICE) package in R. Multiple imputation is the most sophisticated method of addressing missing data, as it relies on frequentist statistics to produce multiple datasets that ultimately converge on the most plausible true missing value (Allison, 2002). MICE is able to handle various data types, such as binary or continuous, because each variable is computed using its own imputation model (White, Royston, & Wood, 2009). Multiple imputation adds power to the analysis and assures that no group is underrepresented in the data, especially relevant in the present study wherein black males were more likely to have missing values (Johnston, O'Malley, & Bachman, 2007). The proportion of missing data for volunteering and each type of substance abuse was no more than 5%. The highest proportion of missing data related to questions regarding religiosity (26%) and family helping with and checking on homework (23.9%).

Data were checked for problems with non-normality, homoscedasticity, and outlying observations. Because the dataset was large and since generalized linear models can accommodate outcomes with non-normal and non-constant error variance, the few variables with moderately skewed distributions were left in their original state. A check for multicollinearity revealed that several constructs representing various types of emotional well-being, such as self-esteem, self-depreciation, and life satisfaction were too highly correlated with one another (at >0.80), severely inflating standard errors. Thus, these constructs were combined into a single scale representing general emotional well-being.

To test the study hypothesis, that volunteering significantly reduces substance abuse and that relational variables are more predictive than psychosocial variables, negative binomial hierarchical regression was employed, testing three separate regression models, each with a

different type of substance abuse as the dependent variable. Typically, Poisson regression is used for data with a high proportion of zeros; however, Poisson regression assumes equidispersion wherein the mean and variance of the dependent variables are equal. This assumption was violated due to overdispersion of the dependent variables in the present study, wherein the variances were substantially higher than the means. Thus negative binomial regression was employed due to its tolerance for overdispersion (White & Bennetts, 1996). Incidence rate ratios (IRRs) were derived from negative binomial regression models by calculating the antilog of the beta coefficients. Like odds ratios, IRRs are always greater than 0, and an effect below 1 demonstrates that the independent variable reduces the predicted rate of substance abuse, whereas an effect greater than 1 indicates that the independent variable increases this rate.

Each of the regression models involved four steps. The first step regressed the independent variable, volunteering, and the control variables, race, parent education, gender, religiosity, extracurricular activities, and grades on each type of substance abuse. The second step added the psychosocial variables, emotional well-being and risk-taking disposition. These variables were expected to somewhat increase the incidence risk ratios and explained proportion of variance, demonstrating a present but weak mediation effect. The third step included the relational variables but omitted the psychosocial variables. These variables, peer, family, and educational attachment, were expected to explain more variance than the psychosocial variables and more substantially increase the IRRs associated with volunteering. Finally, the last step included each group of variables: control variables, psychosocial variables, and relational variables. This time, the IRRs associated with volunteering for each type of substance abuse were expected to slightly increase, as was the explained proportion of variance. Nevertheless, the relational and psychosocial variables were expected to only partially mediate the relationship between volunteering and substance abuse; volunteering was expected to still predict lower levels of substance abuse holding all other variables constant.

Results

Descriptive Statistics

Table 1 displays means, standard deviations, frequencies, and ranges for each variable.

Table 1: Descriptive statistics for all variables

Variable	M	SD	Frequency (%)	Range
Volunteering				
Never	--	--	2436 (24.8%)	--
Few times/year	--	--	4092 (41.6%)	--
Few times/month	--	--	2034 (20.7%)	--
Weekly or more	--	--	1267 (12.9%)	--
Occasions of alcohol use in past 30 days	2.81	6.48	--	0-40
Occasions of marijuana use in past 30 days	2.52	8.15	--	0-40
Number of cigarettes smoked daily in past 30	1.06	3.95	--	0-40
Race			--	
White	--	--	6727 (68.4%)	--
Black	--	--	1357 (13.8%)	--
Hispanic	--	--	1746 (17.8%)	--
Gender				
Male	--	--	4702 (47.8%)	--
Female	--	--	5127 (52.2%)	--
Parent Education	3.91 ¹	1.19	--	1-6
Religiosity	2.58	0.99	--	1-4
Extracurricular Participation	2.29	0.71	--	1-5
Academic Grades	6.35 ²	1.99	--	1-9
Emotional Well-Being	4.10	0.76	--	1-5
Risk-taking Disposition	3.39	0.95	--	1-5
Family Helps with Homework	2.51	1.14	--	1-4
Family Checks on Homework	2.27	1.06	--	1-4
Peer Approval of Substance Use	2.27	0.65	--	1-3
School Attachment	3.08	0.92	--	1-5
College Aspirations	3.34	0.96	--	1-4

Three-quarters of high school seniors volunteer, with the majority volunteering a few times a year and the minority volunteering weekly or more. Smoking was the least frequent type of substance abuse for high school seniors, and drinking was the most frequent type. The substantially higher

means relative to standard deviations for each of the dependent variables demonstrate that the assumption of equidispersion associated with Poisson regression cannot be satisfied, and thus, negative binomial regression was a preferable analytic strategy. Emotional well-being and college aspirations were the only heavily skewed independent variables, as the majority of students reported high levels of well-being and aspirations to graduate college. Due to the large size of the sample, these variables were not transformed.

Correlations

Table 2 shows Pearson correlation coefficients representing the relationship between each of the independent and dependent variables and all other predictors.

Table 2: Pearson’s correlation coefficients for relationships between independent and dependent variables and all other numeric variables

	Volunteering	Smoking	Marijuana	Drinking
Parent education	0.13	-0.08	-0.02	0.01
Religiosity	0.25	-0.12	-0.16	-0.14
Grades	0.24	-0.16	-0.17	-0.13
Extracurric. Participation	0.29	-0.08	-0.1	-0.04
Emotional well-being	0.11	-0.12	-0.06	-0.05
Risk-taking disposition	-0.06	0.09	0.15	0.18
School attachment	0.2	-0.16	-0.17	-0.14
College aspirations	0.2	-0.2	-0.13	-0.07
Friend SA approval	0.19	-0.27	-0.36	-0.29
Family helps with HW	0.09	-0.02	-0.04	-0.07
Family checks on HW	0.1	-0.04	-0.06	-0.08

¹Because this variable was converted from a categorical to numeric scale, this value is roughly equivalent to the response, “some college completed.”

²This value is roughly equivalent to a “B” letter grade.

Several variables had particularly strong correlations with both the independent and dependent variables, including religiosity, academic grades, school attachment, and friend

approval of substance abuse. Family involvement with homework demonstrated consistently weak correlations with volunteering and substance abuse. The strength of correlations for other variables was less consistent. For example, emotional well-being was moderately associated with volunteering and smoking, but not drinking and marijuana use. Risk-taking disposition had a weak association with volunteering but a strong association with each type of substance use.

Additionally, volunteering was moderately correlated with each type of substance use: $r=-0.11$ for smoking, $r=-0.15$ for marijuana, and $r=-0.09$ for drinking. Girls reported volunteering substantially more than boys, as 20% of girls reported never volunteering, compared with 30% of boys. Fewer White students reported never volunteering (22%), compared to Black (28%) and Hispanic (34%) students, but students who volunteered weekly or more were approximately equally represented among the three racial groups. According to the regression models below, girls smoked marijuana and drank on significantly fewer occasions than boys. Compared to White students, Black and Hispanic students smoked significantly fewer cigarettes, and Black students drank on significantly fewer occasions.

Smoking Model

First, the relationship between volunteering and the number of cigarettes smoked daily in the past 30 days was explored. Table 3 shows the incidence rate ratio (IRR) and 95% confidence interval for each variable, as well as Hosmer-Lemeshow's pseudo R^2 for each step.

Table 3: Hierarchical negative binomial regression for number of cigarettes smoked daily in past 30 days

	Step 1				Step 2				Step 3				Step 4			
	IRR	Std. Error	95% CI Lower	95% CI Upper	IRR	Std. Error	95% CI Lower	95% CI Upper	IRR	Std. Error	95% CI Lower	95% CI Upper	IRR	Std. Error	95% CI Lower	95% CI Upper
Volunteer																
Few times/year	0.51	0.49	0.09	0.43	0.55	0.09	0.45	0.66	0.66	0.08	0.56	0.79	0.68	0.08	0.58	0.80
Few times/month	0.52	0.48	0.11	0.42	0.55	0.11	0.44	0.68	0.89	0.11	0.71	1.11	0.90	0.11	0.73	1.12
Weekly or more	0.43	0.57	0.13	0.34	0.46	0.12	0.36	0.58	0.79	0.12	0.62	1.01	0.80	0.12	0.63	1.02
Gender																
Female	0.75	0.25	0.08	0.63	0.80	0.07	0.69	0.92	0.89	0.09	0.73	1.09	0.92	0.09	0.76	1.10
Race																
Black	0.40	0.60	0.13	0.31	0.41	0.12	0.32	0.51	0.37	0.14	0.27	0.49	0.38	0.12	0.29	0.49
Hispanic	0.30	0.70	0.11	0.24	0.28	0.12	0.21	0.36	0.45	0.10	0.37	0.55	0.43	0.11	0.35	0.53
Parent education	0.81	0.19	0.03	0.76	0.80	0.03	0.75	0.85	0.86	0.03	0.81	0.92	0.85	0.03	0.80	0.91
Academic grades	0.80	0.20	0.02	0.78	0.82	0.02	0.79	0.85	0.90	0.02	0.87	0.94	0.91	0.02	0.88	0.94
Religiosity	0.72	0.28	0.04	0.67	0.76	0.04	0.71	0.82	0.82	0.03	0.77	0.88	0.84	0.04	0.79	0.90
Extracurricular involvement	0.88	0.12	0.05	0.79	0.86	0.05	0.78	0.95	0.95	0.05	0.86	1.05	0.94	0.05	0.86	1.04
Risk-taking disposition	—	—	—	—	1.40	0.04	1.30	1.51	—	—	—	—	1.16	0.04	1.08	1.24
Emotional well-being	—	—	—	—	0.64	0.05	0.59	0.70	—	—	—	—	0.78	0.05	0.71	0.86
School attachment	—	—	—	—	—	—	—	—	0.77	0.04	0.72	0.82	0.80	0.04	0.75	0.86
Aspirations to graduate college	—	—	—	—	—	—	—	—	0.70	0.04	0.66	0.75	0.72	0.05	0.67	0.77
Friend substance use approval	—	—	—	—	—	—	—	—	0.23	0.05	0.21	0.25	0.24	0.04	0.22	0.27
Family helps with homework	—	—	—	—	—	—	—	—	1.01	0.04	0.92	1.10	1.03	0.04	0.95	1.13
Family checks homework	—	—	—	—	—	—	—	—	0.90	0.04	0.83	0.96	0.89	0.04	0.82	0.95
Hosmer-Lemeshow Pseudo R2				0.06				0.17				0.28				0.29

Note. Statistically significant values are noted in bold. The “mitools” package in R does not report significance levels of incidence rate ratios. Parameters were determined statistically significant if the number “1” was not present in the confidence interval.

The full model with all the predictors revealed that compared to never volunteering, volunteering a few times a year significantly reduced the number of daily cigarettes smoked by a factor of 68% (95% CI [0.58, 0.80]), adjusting for control, psychosocial, and relational variables. In other words, the average student who had reported smoking cigarettes in the past 30 days and volunteered a few times a year would experience a reduction in smoking from 4.9 daily cigarettes to 3.3 daily cigarettes (4.9 x 0.68), controlling for all predictors. Volunteering a few times a month and weekly or more did not significantly reduce the smoking rate in the full model.

Relational variables explained the relationship between volunteering and smoking much more substantially than did psychosocial variables, as evidenced by the greater increase they produced in IRRs for volunteering. The addition of psychosocial variables in Step 2 only increased the IRR for volunteering yearly, monthly, and weekly by three, three, and five percentage points, respectively. In this step, volunteering at each level, including yearly

(IRR=0.55, 95% CI [0.45, 0.66]), monthly (IRR=0.55, 95% CI [0.44, 0.68]), and weekly (IRR=0.46, 95% CI [0.36, 0.58]) had a statistically significant effect on smoking, adjusting for control variables and psychosocial variables. This model explained 17% of the variance in smoking, an increase of 11 percentage points compared to the Step 1 model with only volunteering and the control variables. The addition of relational variables and the deletion of psychosocial variables in Step 3 increased Step 1 IRRs for yearly, monthly, and weekly volunteering by 15, 36, and 37 percentage points, respectively, demonstrating that volunteering had a substantially weaker effect on smoking when adjusting for control and relational variables, compared with adjusting for control and psychosocial variables. In Step 3, monthly and weekly volunteering were no longer significant; only volunteering a few times a year significantly reduced smoking (IRR=0.66, 95% CI [0.56, 0.79]). This model explained 28% of the variance in smoking, an increase of 22 percentage points from the model predicted in Step 1, and double the increase in explained variance that the psychosocial predictors yielded (11 percentage points). The full model predicted in Step 4 only increased the percent of explained variance from the Step 3 model by one percentage point (Pseudo $R^2 = .29$) and had a negligible effect on the IRR associated with volunteering. Figure 1 illustrates the extent to which each model reduces the number of cigarettes smoked daily by the average high school senior who smokes.

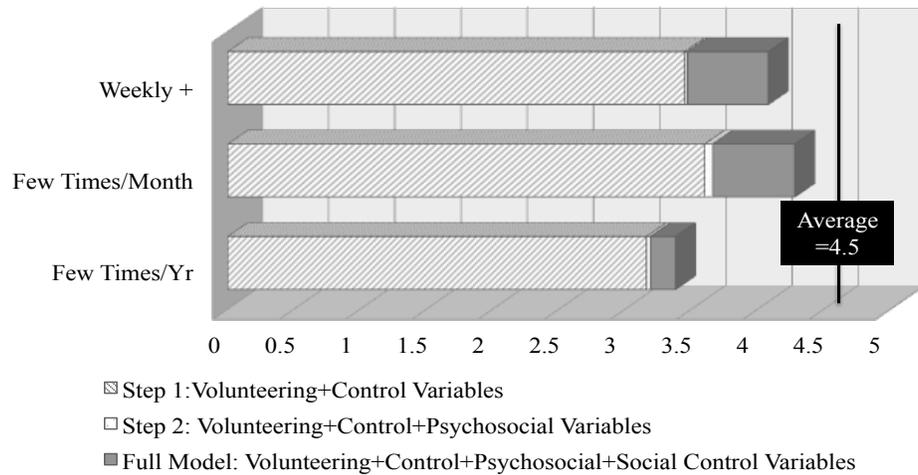


Figure 1: The effect of volunteering in each regression step on the number of daily cigarettes smoked for the average high school senior who has reported smoking cigarettes in the past 30 days.

Marijuana Model

Next, I investigated the relationship between volunteering and the number of occasions of marijuana use in the past 30 days (see Table 4).

Table 4: Hierarchical negative binomial regression for number of occasions of marijuana use in past 30 days

	Step 1				Step 2				Step 3				Step 4			
	IRR	Std. Error	95% CI Lower	95% CI Upper	IRR	Std. Error	95% CI Lower	95% CI Upper	IRR	Std. Error	95% CI Lower	95% CI Upper	IRR	Std. Error	95% CI Lower	95% CI Upper
Volunteer																
Few times/year	0.67	0.10	0.55	0.82	0.68	0.10	0.56	0.83	0.84	0.09	0.70	1.00	0.86	0.09	0.72	1.03
Few times/month	0.45	0.13	0.35	0.58	0.46	0.13	0.36	0.59	0.63	0.12	0.50	0.80	0.64	0.12	0.51	0.81
Weekly or more	0.43	0.15	0.32	0.58	0.47	0.15	0.35	0.62	0.67	0.14	0.52	0.88	0.70	0.14	0.54	0.92
Gender																
Female	0.58	0.08	0.49	0.69	0.64	0.08	0.54	0.76	0.65	0.08	0.56	0.76	0.71	0.08	0.61	0.83
Race																
Black	1.07	0.15	0.79	1.45	1.34	0.17	0.94	1.91	1.38	0.13	1.08	1.78	1.54	0.13	1.20	1.98
Hispanic	0.66	0.13	0.51	0.85	0.69	0.14	0.51	0.92	0.87	0.11	0.70	1.09	0.87	0.11	0.70	1.08
Parent education	1.04	0.04	0.96	1.12	1.01	0.04	0.94	1.08	1.08	0.04	1.01	1.16	1.07	0.04	1.00	1.15
Academic grades	0.80	0.02	0.76	0.83	0.82	0.02	0.78	0.86	0.85	0.02	0.81	0.89	0.87	0.02	0.83	0.91
Religiosity	0.63	0.04	0.58	0.69	0.64	0.04	0.58	0.70	0.70	0.04	0.64	0.75	0.69	0.04	0.64	0.75
Extracurricular involvement	0.87	0.06	0.77	0.98	0.88	0.06	0.78	0.98	0.88	0.05	0.79	0.98	0.87	0.05	0.78	0.97
Risk-taking disposition	---	---	---	---	1.60	0.04	1.47	1.74	---	---	---	---	1.41	0.04	1.30	1.52
Emotional well-being	---	---	---	---	0.80	0.05	0.72	0.89	---	---	---	---	0.98	0.05	0.89	1.08
School attachment	---	---	---	---	---	---	---	---	0.80	0.04	0.74	0.87	0.81	0.04	0.75	0.88
Aspirations to graduate college	---	---	---	---	---	---	---	---	0.94	0.04	0.87	1.02	0.88	0.04	0.81	0.96
Friend substance use approval	---	---	---	---	---	---	---	---	0.14	0.06	0.13	0.16	0.15	0.06	0.14	0.17
Family helps with homework	---	---	---	---	---	---	---	---	1.07	0.04	0.98	1.17	1.08	0.04	0.99	1.18
Family checks homework	---	---	---	---	---	---	---	---	0.94	0.04	0.86	1.02	0.92	0.04	0.85	1.00
Hosmer-Lemeshow Pseudo R2				0.12				0.14								0.32

Note. Statistically significant values are in bold. The “mitools” package in R does not report significance levels of incidence rate ratios. Parameters were determined statistically significant if the number “1” was not present in the confidence interval.

The full model with all the predictors revealed that compared to never volunteering, volunteering monthly and weekly significantly reduced the number of occasions of marijuana use by a factor of 64% (95% CI [0.51, 0.81]) and 70% (95% CI [0.54, 0.92]), respectively, adjusting for control, psychosocial, and relational variables. Thus, the average student who reported smoking marijuana in the past 30 days and volunteering monthly or weekly, respectively, would experience a reduction in the number of occasions of marijuana use from 12.8 times to 8.2 or 9 times, respectively. Volunteering a few times a year did not significantly reduce the smoking rate in the full model.

Again, relational variables acted as more powerful mediators between volunteering and marijuana use than did psychosocial variables. The addition of psychosocial variables in Step 2 only increased the IRR for volunteering yearly, monthly, and weekly by one, one, and three percentage points, respectively. In the Step 2 model, volunteering at each level, including yearly (IRR=0.68, 95% CI [0.56, 0.83]), monthly (IRR=0.46, 95% CI [0.36, 0.59]), and weekly (IRR=0.47, 95% CI [0.35, 0.62]) had a statistically significant effect on marijuana use, adjusting for control variables and psychosocial variables. This model explained 14% of the variance in marijuana use, an increase of only two percentage points compared to the Step 1 model with only volunteering and the control variables. The addition of relational variables and the deletion of psychosocial variables in Step 3 increased the IRR from Step 1 for yearly, monthly, and weekly volunteering by 17, 18, and 24 percentage points, respectively, demonstrating again that volunteering had a substantially weaker effect on marijuana use when adjusting for control and relational variables, compared with adjusting for control and psychosocial variables. In Step 3, monthly volunteering (IRR=0.63, (95% CI [0.50, 0.80]) and weekly volunteering (IRR=0.67, (95% CI [0.52, 0.88]) remained significant, but volunteering yearly was no longer significant. This model explained 30% of the variance in marijuana use, an increase of 18 percentage points from the model predicted in Step 1, and 9 times the increase in explained variance that the psychosocial predictors yielded (2 percentage points). The full model predicted in Step 4 only

increased the percent of explained variance from the Step 3 model by two percentage points (Pseudo $R^2 = .32$) and only very slightly increased the IRRs associated with volunteering. Figure 2 illustrates the extent to which volunteering in each model reduces the number of occasions of marijuana use by the average high school senior who reported using the substance in the past 30 days.

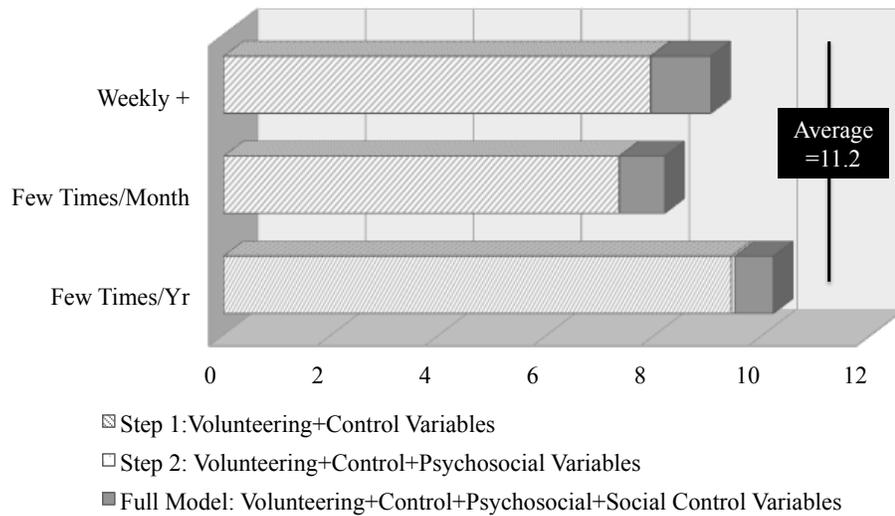


Figure 2: The effect of volunteering in each regression step on the number of occasions of marijuana use for the average high school senior who has reported using marijuana in the past 30 days.

Drinking Model

Finally, I investigated the relationship between volunteering and the number of occasions of alcohol use in the past 30 days (see Table 5).

Table 5: Hierarchical negative binomial regression for number of occasions of alcohol use in past 30 days

	Step 1				Step 2				Step 3				Step 4			
	Std.		95% CI		Std.		95% CI		Std.		95% CI		Std.		95% CI	
	IRR	Error	Lower	Upper												
Volunteer																
Few times/year	0.89	0.06	0.80	0.99	0.90	0.05	0.81	1.00	1.03	0.05	0.93	1.15	1.03	0.05	0.93	1.14
Few times/month	0.84	0.07	0.74	0.96	0.85	0.07	0.75	0.97	1.06	0.07	0.93	1.21	1.07	0.07	0.94	1.21
Weekly or more	0.67	0.08	0.58	0.79	0.66	0.08	0.57	0.77	0.83	0.08	0.71	0.96	0.81	0.08	0.70	0.94
Gender																
Female	0.73	0.04	0.67	0.80	0.80	0.04	0.74	0.87	0.83	0.04	0.76	0.90	0.91	0.04	0.83	0.98
Race																
Black	0.47	0.09	0.39	0.56	0.54	0.09	0.45	0.65	0.50	0.08	0.42	0.59	0.55	0.08	0.47	0.64
Hispanic	0.74	0.07	0.65	0.84	0.73	0.07	0.63	0.84	0.94	0.06	0.83	1.06	0.89	0.06	0.79	1.02
Parent education	0.99	0.02	0.95	1.03	0.99	0.02	0.95	1.03	1.02	0.02	0.98	1.06	1.02	0.02	0.98	1.06
Academic grades	0.88	0.01	0.86	0.90	0.89	0.01	0.87	0.92	0.91	0.01	0.89	0.94	0.92	0.01	0.90	0.94
Religiosity	0.77	0.02	0.73	0.80	0.79	0.02	0.75	0.82	0.84	0.02	0.81	0.88	0.86	0.02	0.82	0.89
Extracurricular involvement	1.09	0.03	1.02	1.16	1.06	0.03	1.00	1.13	1.11	0.03	1.05	1.18	1.09	0.03	1.02	1.15
Risk-taking disposition	---	---	---	---	1.47	0.02	1.40	1.54	---	---	---	---	1.36	0.02	1.30	1.42
Emotional well-being	---	---	---	---	0.92	0.03	0.87	0.97	---	---	---	---	1.05	0.03	1.00	1.11
School attachment	---	---	---	---	---	---	---	---	0.87	0.02	0.83	0.91	0.88	0.02	0.84	0.92
Aspirations to graduate college	---	---	---	---	---	---	---	---	1.01	0.02	0.96	1.05	0.99	0.02	0.94	1.04
Friend substance use approval	---	---	---	---	---	---	---	---	0.40	0.03	0.37	0.43	0.42	0.03	0.39	0.44
Family helps with homework	---	---	---	---	---	---	---	---	0.96	0.02	0.92	1.00	0.96	0.02	0.92	0.99
Family checks homework	---	---	---	---	---	---	---	---	0.90	0.02	0.86	0.95	0.91	0.02	0.87	0.95
Hosmer-Lemeshow Pseudo R2				0.06				0.1				0.15				0.18

Note. Statistically significant values are in bold. The “mitools” package in R does not report significance levels of incidence rate ratios. Parameters were determined statistically significant if the number “1” was not present in the confidence interval.

The full model with all the predictors revealed that compared to never volunteering, volunteering weekly significantly reduced the number of occasions of alcohol use by a factor of 81% (95% CI [0.70, 0.94]), adjusting for control, psychosocial, and relational variables. Thus, the average student who consumed alcohol and volunteered weekly would experience a reduction in the number of occasions of alcohol use from 6.3 times to roughly five times. Volunteering a few times a year and volunteering monthly did not significantly reduce the rate of alcohol use in the full model.

Consistent with the models predicting tobacco and marijuana use, relational variables acted as more powerful mediators between volunteering and marijuana use than did psychosocial variables. The addition of psychosocial variables in Step 2 only increased the IRR for volunteering yearly and weekly by one percentage point each, and the IRR associated with volunteering monthly actually increased by one percentage point after including the psychosocial variables. In the Step 2 model, volunteering monthly (IRR=0.85, 95% CI [0.75, 0.97]), and

weekly (IRR=0.66, 95% CI [0.57, 0.77]) had a statistically significant effect on alcohol use, adjusting for control variables and psychosocial variables. This model explained 10% of the variance in alcohol use, an increase of four percentage points compared to the Step 1 model containing only volunteering and the control variables. The addition of relational variables and the deletion of psychosocial variables in Step 3 increased the IRR from Step 1 for yearly, monthly, and weekly volunteering by 14, 22, and 16 percentage points, respectively, revealing again that volunteering had a substantially weaker effect on alcohol use when adjusting for control and relational variables, compared with adjusting for control and psychosocial variables. In Step 3, only weekly volunteering (IRR=0.83, (95% CI [0.71, 0.96]) remained significant. This model explained 15% of the variance in alcohol use, an increase of nine percentage points from the model predicted in Step 1, and more than double the increase in explained variance yielded by the psychosocial variables (four percentage points). The full model predicted in Step 4 only increased the percent of explained variance from the Step 3 model by three percentage points (Pseudo $R^2=.18$) and had negligible effect on the IRRs associated with volunteering. Figure 3 illustrates the extent to which volunteering in each model affects the number of occasions of alcohol use by the average high school senior who reported using the substance in the past 30 days.

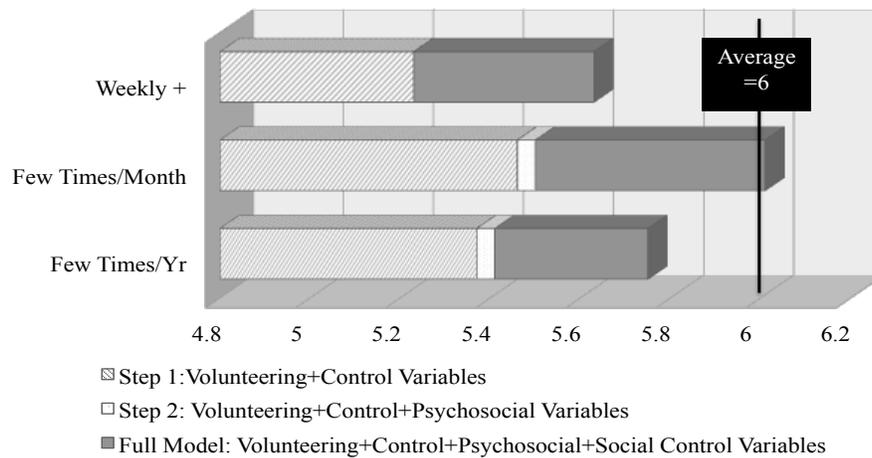


Figure 3: The effect of volunteering in each regression step on the number of occasions of alcohol use for the average high school senior who has reported drinking in the past 30 days.

Discussion

This study tested 1) whether volunteering was associated with a reduction in tobacco, marijuana, and alcohol use among high school seniors; 2) if so, whether the relationship was better explained by psychosocial or relational factors; and 3) which dosage of volunteering was most effective. The results demonstrated that volunteering was associated with a reduction in each type of substance abuse, although different dosages of volunteering yielded different effects for each dependent variable. Volunteering a few times a year was significantly associated with about a one third reduction in the number of daily cigarettes smoked; volunteering a few times a month and weekly or more were both significantly associated with about a one third reduction in occasions of marijuana use; and volunteering weekly or more was significantly associated with a reduction of about one fifth in occasions of alcohol use. Considering the magnitude of high school seniors who volunteer (75%), these effects also suggest practical significance. Since the majority of young people who volunteer only do so a few times a year (55%), this study suggests that smoking may be the type of substance abuse most drastically reduced by volunteering. Additionally, 45% of students volunteer a few times a month or more, suggesting that

volunteering may also have a powerful effect on marijuana use. In contrast, only 17% of students who volunteer do so weekly or more, indicating that alcohol use is the least likely type of substance abuse to be reduced by volunteering. Additionally, volunteering had a much smaller effect size associated with alcohol use, compared to tobacco and marijuana.

Two specific findings related to volunteering dosage merit further elaboration. First, volunteering a few times a year or a few times a month were actually associated with an increased incidence rate ratio for drinking, although these effects were not statistically significant. These results do not indicate that volunteering directly causes one to drink more; they may, however, reflect the fact that drinking is a more normative form of substance abuse, engaged in by involved students. Second, it is curious that volunteering just a few times a year is associated with smoking reduction, while more frequent volunteering levels are insignificant. This may be the product of a spurious relationship between volunteering and smoking, which is mediated by a type of emotional distress that was not captured with the measure used in the present study. In this study, smoking was substantially more negatively correlated with emotional well-being than were marijuana and alcohol use ($r=-0.12$). This corroborates other studies, which have found a strong relationship between emotional distress and smoking (Tyas & Pederson, 1998; Orlando, Ellickson, & Jinnett, 2001). More specifically, Ennett and Bauman (1994) found that high school smokers were more isolated from their peers at school. Perhaps, students who frequently volunteer do so because they are not fitting in at school and are searching for more meaning in their lives. These students may also be at more risk for smoking. This is only a hypothesis, and future research should further explore this relationship as well as understand what types of students frequently volunteer.

Regarding the relative mediating effects of the relational and psychosocial explanations, this study consistently demonstrated that relational variables had a dramatically stronger effect on the relationship between volunteering and substance abuse than did psychosocial variables. In other words, students who volunteer may benefit from positive peer and family influences and

harbor bonds to institutions such as school and college; these attachments, in turn, may cause students to be less likely to engage in substance abuse. This is particularly true for smoking, where the model that included relational variables most substantially weakened the relationship between volunteering and substance abuse. On the other hand, according to these results, volunteering is unlikely to be associated with lower rates of substance abuse due to internal characteristics, such as self-esteem, life satisfaction, and risk-taking disposition.

This finding does not conclusively suggest that volunteering does not impact psychosocial characteristics. There may be significant interactions between relational and psychosocial variables; for example, volunteering may have an especially strong effect on a student who is prone to risky behavior but meets prosocial friends while preparing meals at a homeless shelter. Or, perhaps, students benefit from increased self-esteem only when volunteering involves a connection with a positive adult role model. Future research should explore such interaction effects.

Strengths and Limitations

This study has several limitations. The most prominent limitation is that because the data are cross-sectional, it is not possible to determine that volunteering *causes* decreased substance abuse rates; rather, this study can only suggest that these variables are associated. However, the author was able to control for every available variable that was theoretically related to both the independent and the dependent variables; the fact that some dosage of volunteering was significantly associated with substance abuse even after holding qualities such as academic grades, religiosity, and other extracurricular participation constant, evokes the possibility that volunteering could have a direct causal effect on substance abuse. Additionally, using data regarding substance abuse behavior in the past 30 days optimizes the chance that volunteering occurred before the behavior, a prerequisite to determining causality. Nevertheless, this study cannot make any definite claims that a causal relationship exists.

Additionally, this study relied on student self-report data. Because the survey was long and students completed it at school, which likely raises concerns about anonymity for many students, a high proportion of students did not answer every question. Rather than use listwise deletion, which would have severely reduced power (Allison, 2002) this study employed multiple imputation, a widely accepted strategy for handling missing data (Graham, 2009). This strategy introduces random error into the imputation process to yield unbiased estimates of all parameters and standard errors (Allison, 2002). Fortunately, the proportion of missing cases for all dependent and independent variables was small. Diagnostics assured that the distributions for multiply imputed variables were similar to distributions found in the true data. Despite doing everything possible to preserve as much sample representativeness as possible, it is worth noting that adolescents who had dropped out of high school by their senior year or who were absent on the day of survey administration were not represented in the study.

An additional problem with self-report data collection in school settings is the chance that certain students under-report their true amount of substance use. However, O'Malley, Bachman, and Johnston (1983) have determined that MTF substance abuse measures are highly reliable, as they found consistency of responses over time among the same individuals, and valid, as they have asked friends of respondents to evaluate the respondent's level of substance use. Another limitation concerned the independent variable; because there was only one item measuring volunteering, students may have had different perceptions regarding what counts as volunteer work. Furthermore, as mentioned before, young people participate in many different types of civic activities, which may yield significantly different outcomes. For example, the adolescent who engages in *personally responsible* volunteer work may be more likely to adhere to conventional norms than the adolescent who participates in *social justice oriented* volunteer work (Westheimer & Kahne, 2006). Future research should test this hypothesis.

There were also limitations to using an existing dataset. First, the construct measuring emotional well-being was heavily skewed. Many of the items comprising this scale were derived

from the Rosenberg Self-Esteem scale, which is a standard and widespread scale used to measure self-esteem (Blascovich & Tomaka, 1991). Nevertheless, measures that yielded more variation would have improved the explanatory power of this variable. Given the difficulty in measuring emotional well-being, qualitative research may be better suited to exploring its relationship with volunteering. Additionally, this dataset did not contain scales measuring family relationships; the author was forced to use single items to fulfill this construct. Also, the author would have liked to include a construct concerning relationships to non-family adults as a relational variable, due to the theoretical relevance of such relationships to both volunteering and substance abuse prevention. A final limitation in using an existing dataset was that response categories for drinking, smoking, and marijuana levels had to be transformed from categorical to count data by using the midpoint of each category. Using an exact estimation of substance abuse frequency would have been preferable.

Despite these limitations, this study has several strengths. The MTF study has several key strengths, including high levels of reliability and validity, the representativeness of the national sample, and low levels of sampling error (Bachman, Johnston, & O'Malley, 2001). By combining several years of data and using multiple imputation, the present study had ample power to avoid Type I errors. Large samples may increase Type II errors, finding significance where it does not actually exist, but effect sizes could be ascertained from incidence rate ratios, enabling assessment of the practical significance of the findings. The finding that volunteering is associated with a reduction in substance use ranging from 19% to 36%, even after adjusting for theoretically relevant confounding variables, suggests that volunteering may truly be an effective strategy to reducing risk behavior.

This study was also unique for exploring how volunteering caused reduction in substance abuse rather than dichotomizing the dependent variables into *use* or *no use*. Although to the best of the author's knowledge, there is no clear cut marker of what level of tobacco, marijuana, and alcohol use in adolescence is considered risky, this study was able to demonstrate that

volunteering reduced levels of these behaviors. Although ideally adolescents would never smoke, drink, or use marijuana, understanding how volunteering reduces use rather than prevents use altogether may be a more developmentally appropriate and realistic way to understand its effects.

To the best of the author's knowledge, this was the first study to compare two common explanations for the relationship between volunteering and risk behavior. Although more research is needed, particularly to understand possible interactions between these two explanations, findings suggest that volunteering may strengthen bonds to individuals and institutions, which could result in decreased risk behavior. These implications are important for practitioners and policy-makers working in schools, school districts, states, and the federal government, as the majority of U.S. high school students spend some time volunteering. This study also suggests that more frequent volunteering is not necessarily associated with reduced risk behavior for all types of substance abuse. As required service hours become a more prominent feature of American high schools – over 40% have these requirements (Corporation for National Community Service, 2008) – these findings suggest that focusing more attention on the quality of volunteer experiences may yield stronger outcomes than solely focusing on time investment. More implications of this study are discussed in the next section.

Implications

This study further confirms that positive youth development is an appropriate lens through which to promote risk reduction. Rather than focusing on deficits as a prevention strategy, positive youth development scholars explore the association between young peoples' assets and risk reduction. Specifically, the findings of the present study indicate that young people should continue to be provided with opportunities to volunteer. Although volunteering rates among adolescents have increased considerably compared to several decades ago, they declined by five percentage points from 2005 to 2009 (Kirby, Kawashima-Ginsberg, & Godsay, 2011). Additionally, there are volunteering disparities between population sub-groups: girls are

significantly more likely to volunteer than are boys and socioeconomically disadvantaged adolescents are less likely to volunteer (Kuperminc, Holditch, & Allen, 2001). While schools and school districts may be in the most optimal position to afford students service opportunities, state and federal policies may also play important roles. For example, there is considerable variation in volunteering rates among late adolescents by state, from the lowest of 14% in Mississippi to the highest of 51% in Utah, with large variation in prevalence of state policies supporting youth service (Kirby, Kawashima-Ginsberg, & Godsay, 2011). On a federal level, Congress would be wise to continue funding government agencies such as the Corporation for National and Community Service, which manages several large-scale youth volunteer programs and lost significant funding in the 2011 federal budget.

This study also suggests that certain types of volunteer opportunities may yield better results than others. Volunteer opportunities that enable positive bonding experiences to individuals, including peers, family members, and other adults, and to institutions, including community organizations and school, may result in the most powerful effects.

This finding is consistent with other studies demonstrating that volunteering generates more desirable outcomes in contexts where there is opportunity for supportive relationships with adults (Conrad & Hedin, 1981b; Calabrese & Shumer, 1986; LoSciuto, Rajala, Townsend, & Taylor, 1996). Unfortunately, *Monitoring the Future* did not ask questions about the types of volunteering in which students are engaged. According to the U.S. Census' Current Population Survey, however, the five most common volunteer activities for high school students, in descending order, are collecting, preparing, or distributing food or other items; mentoring and tutoring; fundraising; general labor; and music, performance, and art (Marcelo, 2007). Only one of these activities – mentoring and tutoring – explicitly implies direct interaction with other individuals.

Service-learning, the practice of connecting service to academic curriculum, has demonstrated success in generating school attachment, positive relationships with peers and adults, and greater aspirations for the future (Billig, 2002; Melchior, 1998; RMC Research, 2005),

and may be an especially effective tool for reducing risk behavior. Although 86% of secondary schools report offering community service activities, only 35% of schools offer service-learning opportunities, and this rate has declined by 11 percentage points since 1999 (Corporation for National Community Service, 2008). Principals report that the primary reasons for not offering service-learning in schools concern lack of time because of state curriculum requirements, lack of funding, and the absence of someone to coordinate the activities (Corporation for National Community Service, 2008). School districts can support service-learning through district staff support, professional development, technical assistance, and online exchanges. Several school districts have also made service-learning a graduation requirement (National Service-Learning Clearinghouse, 2007). State policies can also promote service-learning; for example, several states permit service-learning to count toward graduation requirements, include service-learning in state education standards, and have policies regarding the authorization of funding appropriations to service-learning programs. However, as of 2007, 23 states still had no mention of service-learning in any state policy (National Service-Learning Clearinghouse, 2007).

Exactly what these state policies should entail is beyond the scope of this paper, as is a recommendation regarding whether schools, districts, and states should enact mandatory service requirements. This study also cannot offer conclusive recommendations on what dosage of volunteering may produce the most desirable outcomes, although it is important to note that volunteering just a few times a year was associated with a reduction in smoking. Other studies also suggest that more frequent volunteering may not be more effective. For example, Davila and Mora (2007) found that students who participated in community service less than once a week improved their academic achievement more substantially than students who participated more than once a week. An evaluation of the Teen Outreach program also revealed that perceived program quality, such as opportunities for students to learn new skills and consider future goals, significantly predicted reductions in risk behavior while the number of hours they spent volunteering had no effect (Allen, Kuperminc, Philliber, & Herre, 1994). The results of this study

and others show that qualities of volunteer activities, such as structure and opportunities to interact with pro-social peers and adults, may be more salient predictors than frequency of volunteering. Researchers, practitioners, and policymakers should continue to examine qualities of successful youth civic engagement programs.

Finally, this study has important implications for future research. The study presents strong evidence that relationships – to people and to institutions – are pertinent mechanisms of risk behavior reduction. Yet, frequently, program evaluation research tends to overlook or underplay the potentially substantial explanatory power of relationships in determining a program’s effectiveness. Perhaps the most active proponents of understanding how relationships affect behavior are social network analysis (SNA) scholars who contend that truly understanding human behavior requires going beyond collecting and analyzing attribute data, such as race and social class. Rather, SNA recognizes that peoples’ characteristics and behaviors are influenced by and influence their social networks (Wellman, 1988); for example, a student who volunteers alongside a prosocial group of peers and is supervised by a well-respected adult may have a much more profound experience than a student who volunteers by cleaning a park by herself. Although this study was not able to conduct SNA, the results suggest that this methodology may be a useful tool for better understanding how volunteering affects outcomes through strengthening relationships.

Conclusion

As young people today are often perceived as apathetic, materialistic, and even violent (Checkoway et al., 2003; Males, 2006), it is essential to recognize that more adolescents volunteer now than ever before and that the United States is a world leader in youth volunteering. This study supported extant literature demonstrating that young people benefit from volunteering; as a consequence, society benefits when fewer adolescents engage in risky behavior. However, one must thoughtfully interpret this evidence. Rather than assume that students who volunteer

more will concomitantly benefit more, researchers, practitioners, and policymakers should focus on understanding how to design and structure youth volunteer opportunities to yield the greatest benefit. Furthermore, in order to alleviate disparities in volunteering rates, researchers must begin to better understand which particular program features maximize outcomes across age, gender, racial, and socioeconomic sub-groups. As schools and communities face increasing pressure to do more with less, widespread commitment is needed to engage young people in quality volunteer experiences that benefit both the volunteer and society at large.

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