Cigarette Smoking as a Coping Strategy: Negative Implications for Subsequent Psychological Distress Among Lesbian, Gay, and Bisexual Youths*

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Objective The heightened risk of cigarette smoking found among lesbian, gay, and bisexual (LGB) youths may be because smoking serves as a coping strategy used to adapt to the greater stress experienced by LGB youths. The current report examines whether smoking moderates the relation between stress and subsequent psychological distress, and whether alternative coping resources (i.e., social support) moderate the relation between smoking and subsequent distress. Method An ethnically diverse sample of 156 LGB youths was followed longitudinally for 1 year. Results Significant interactions demonstrated that smoking amplified the association between stress and subsequent anxious distress, depressive distress, and conduct problems. Both friend and family support buffered the association between smoking and subsequent distress. Conclusions Smoking has negative implications for the distress of LGB youths, especially those reporting high levels of stress or few supports. Interventions and supportive services for LGB youths should incorporate smoking cessation to maximally alleviate distress.

Key words adolescent; emotional distress; sexual orientation; social support; tobacco; stress.

Despite the substantial negative health effects of cigarette smoking (Case et al., 2004; Dibble, Roberts, Roberston, & Paul, 2002; Heck & Jacobson, 2006; Marshall, McCormack, & Kirk, 2009; Roberts, Dibble, Nussey, & Casey, 2003), lesbian, gay, and bisexual (LGB) adolescents and young adults are at significantly increased risk of smoking cigarettes relative to their heterosexual peers (Austin et al., 2004; Bontempo & D’Augelli, 2002; McCabe, Boyd, Hughes, & d’Arcy, 2003; McCabe, Hughes, Bostwick, & Boyd, 2005; Udry & Chantala, 2002; see Lee, Griffin, & Melvin, 2009 for review). These studies have estimated the prevalence of smoking to range between 32% and 50% among LGB youths, as compared with 8% and 35% among heterosexual youths (Austin et al., 2004; McCabe et al., 2003, 2005; Udry & Chantala, 2002). These disparities have been identified regardless of whether sexual orientation is assessed through identity, attractions, or sexual behavior (Lee et al., 2009; McCabe et al., 2005). Furthermore, recent research has suggested that the prevalence of cigarette use is greater among LGB youths than among LGB adults (Lampinen, Bonner, Rusch, & Hogg, 2006; McKirnan, Tolou-Shams, Turner, Dyslin & Hope, 2006). Although critical for preventative and cessation efforts, the reasons why LGB youths are more likely to smoke remain under-examined.

Although little examined among LGB individuals, the larger research literature on cigarette smoking suggests that experiences of stressful events and the resulting emotional or psychological distress play a critical role in cigarette use (see Kassel, Stroud, & Paronis, 2003 for review). Specifically, the stress and coping model of substance use (Wills & Shiffman, 1985; Wills & Filer, 1996) suggests that individuals with greater stress experiences, feelings of distress, and who lack other coping resources (e.g., social support) may smoke cigarettes as a method of coping with stress. Indeed, when smokers are questioned about their

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reasons for smoking, both heterosexual and LGB youths consistently report that they smoke more when they experience stress (Falkin, Fryer, & Mahadeo, 2007; Johnson et al., 2003; Nichter, Nichter, & Carkoglu, 2007; Remafedi, 2007). Furthermore, research has consistently found that higher levels of stress are associated with increased smoking initiation (Finkelstein, Kubzansky, & Goodman, 2006; Sullivan, Kung, & Farrell, 2004), a higher prevalence of smoking (Cohen, Schwartz, Bremet, & Parkinson, 1991; Roberts, Fuemmeler, McCleron, & Beckham, 2008), a greater frequency of smoking (Wills & Cleary, 1996), and a greater quantity of cigarettes smoked (Todd, 2004; Vollrath, 1998; Wills, McNamara, Vaccaro, & Hirky, 1996; Wills, Vaccaro, & McNamara, 1992) among general samples (i.e., predominantly heterosexual) of adolescents and adults.

Although the smoking literature has focused on the role of stressful experiences on smoking, much less is known about the effectiveness of cigarette smoking as a coping strategy that aims to reduce feelings of depression, anxiety, and other psychological distress resulting from stress (Wills & Shiffman, 1985; Wills & Filer, 1996). From this perspective, cigarette smoking is negatively reinforcing; thus, smoking should reduce distress either directly (as in a self-medication view; Khantzian, 1997) or by moderating the negative impact of stress on distress (from a stress and coping view; Wills & Filer, 1996). In contrast, another hypothesis has suggested that cigarette smoking in fact increases psychological distress (Parrott, 1999), suggesting that any perception of reduced distress is due to the alleviation of withdrawal symptoms (Parrott, 1994). As with the stress and coping model mentioned above, this may work in one of two ways: either smoking has a direct effect on increasing psychological distress or smoking may exacerbate the negative role of stressful events on psychological distress.

Research on the effectiveness of cigarette smoking in reducing or increasing psychological distress has been mixed (see Kassel et al., 2003 for review). Although some laboratory studies have found that coping with stressful events through smoking does reduce immediate psychological distress levels (Kassel et al., 2007; Perkins Grobe, Fonte, & Breus, 1992), others have failed to document reductions in negative mood (Conklin & Perkins, 2005; Herbert, Foulds, & Fife-Schaw, 2001). Even when immediate reductions in distress have been found, there is evidence that it occurs even before the first puff (Moghaddam & Ferguson, 2007) and even when the cigarettes contain no nicotine (Perkins et al., 2008). In addition, a recent meta-analysis of laboratory research examining the effects of nicotine (administered without smoking) found that it increased tension and decreased relaxation (Kalman & Smith, 2005). Similarly, some field research using longitudinal designs also has documented that both adolescent and adult smokers are at increased risk for subsequent depressive distress (Choi, Patten, Gillin, Kaplan, & Pierce, 1997; Goodman & Capitman, 2000; Steuber & Danner, 2006; Wu & Anthony, 1999); that increased smoking is associated with same day increases in negative affect (Aronson, Almeida, Stawski, Klein, & Kozlowski, 2008); and, that initiation of smoking is associated with increased depressive distress (Munafò, Hitsman, Rende, Metcalfe, & Niaura, 2007). However, after a careful and detailed review of the literature, Kassel and colleagues (2003) conclude that further research is needed, given the inconsistent findings regarding whether smoking cigarettes increases or decreases distress levels.

In addition to examining the relations among smoking, stressful events, and psychological distress, further research is needed on whether the availability of other coping resources (e.g., social support) moderates the relation between smoking and distress. Specifically, the stress and coping model of substance use posits that individuals who lack social support are at an increased risk of smoking (Wills & Filer, 1996). Indeed, research has documented that both adults and adolescents with low levels of social support are more likely to initiate smoking (Sullivan et al., 2004), smoke more frequently (Wills & Cleary, 1996), and consume a greater quantity of cigarettes (Wills et al., 1992, 1996). Further, given that social support is a highly effective resource for reducing psychological distress (Wills & Fegan, 2001), social support may moderate the role of smoking on distress, such that smokers with adequate social support may be less distressed than those with few social supports.

Examining the role of smoking, stress, and social support on psychological distress is particularly critical among LGB youths because they, relative to heterosexual youths, report higher levels of smoking, stress, and distress, as well as more problematic social relationships. Given the stigmatized nature of same-sex sexuality, LGB youths experience high levels of victimization and rejection (Bontempo & D’Augelli, 2002; Russell, Franz, & Driscoll, 2001) and less support from both parents and peers (Ueno, 2003; Williams, Connolly, Pepler, & Craig, 2005). This higher stress and lower support may contribute to the higher prevalence of smoking (McCabe et al., 2005; see review above) and to the higher prevalence of psychological distress found among LGB youths (Bontempo & D’Augelli, 2002; Jorm et al., 2002; Udry & Chantala, 2002). However, to date, research on LGB youths has not examined whether the use of cigarettes is associated with
psychological distress, as far as we know. Therefore, building on our own earlier work on the prevalence of cigarette use (Rosario, Hunter & Gwadz, 1997) and predictors of cigarette smoking (Rosario, Schrimshaw, & Hunter, 2004, 2009), the current study uses the stress and coping model to longitudinally examine whether stress is associated with smoking among LGB youths and whether smoking moderates the relations between stress and subsequent psychological distress. The study also examines whether the availability of other coping resources—such as social support—serves to moderate the association between smoking and psychological distress. The examination occurs among LGB youths in order to more fully understand the role of smoking in this population.

**Methods**

**Participants**

Youths, ages 14–21 years, were recruited from three LGB-focused community-based organizations (CBO; 85%) and two LGB college student organizations (15%) in New York City. The sample consisted of 156 youths (51% male) with a mean age of 18.3 years ($SD = 1.65$). The youths identified as lesbian or gay (66%), bisexual (31%), or other (3%). Youths were of Latino (37%), Black (35%), White (22%), and Asian and other backgrounds (7%).

**Procedure**

All youths provided voluntary and signed informed consent. The Commissioner of Mental Health for the State of New York waved parental consent for youths under age 18. Instead, an adult at each CBO served in loco parentis to protect the rights of each underage participant. The university’s institutional review board and each recruitment site approved the study.

Youths participated in a 2- to 3-hr structured interview at recruitment (Time 1) with follow-up interviews conducted 6 (Time 2) and 12 months (Time 3) later. Interviews occurred between October 1993 and June 1994, with follow-up interviews conducted through August 1995. Interviews were conducted in a private room at the recruitment sites (at Time 1) and in a private location convenient for each youth at subsequent interviews. Interviews were conducted by college-educated individuals who were comfortable with LGB individuals and who were of the same sex as the youth. Each interviewer received 20 hr of training on conducting interviews, conducted practice interviews, and audio-taped interviews were monitored for quality. Youths received $30 at each interview.

Youths were contacted by telephone either directly or through members of their social network to schedule follow-up interviews. The retention rates were 92% ($n = 143$) for the 6-month assessment and 90% ($n = 140$) for the 12-month assessment; 85% ($n = 133$) of youths were interviewed at all three times. Only five youths were lost to both follow-up assessments.

**Measures**

**Cigarette Smoking Over Time**

The quantity of cigarette use was assessed at all three assessments using the Alcohol and Drugs Schedule (ADS) which has demonstrated good test-retest reliability (Rosario et al., 1997). The ADS was adapted from several national survey measures of substance use among youths. The quantity of cigarettes used was assessed in the past 3 months at Time 1, and within the past 6 months (since the last interview) at each subsequent assessment. The average quantity of cigarette use per day was assessed on a 7-point scale ranging from “Did not smoke cigarettes in the past [three/six] months” (0) to “About two packs or more per day (over 35 cigarettes)” (6). Nevertheless, the smoking distributions were binary in that 51%, 52%, and 42% of youths reported not smoking at Times 1–3, respectively. In addition, there were too few youths who quit smoking or who initiated smoking during the study to examine them separately. Consequently, given these distributions, a single smoking composite across the assessments was created for each youth: Smokers were defined as youths who reported smoking at all three assessments or who initiated cigarette smoking during the study; nonsmokers were youths who reported not smoking at any of the three assessments. Youths who quit smoking during the study were excluded from the analyses.

**Stressful Life Events**

We used a checklist of stressful life events that had been developed for adolescents (Johnson & McCutcheon, 1980), updated for use with gay male youths in New York City (Rotheram-Borus, Rosario, Van Rossem, Reid, & Gillis, 1995), and which we further refined for LGB youths in New York City. This 46-item checklist contains 12 items related to homosexuality and 34 items related to events in several domains, including, for example, family, personal, peer, and school-related stressors. The checklist was administered at Time 1. Youths were asked whether they had experienced (yes/no) each one of the events within the past 3 months. A count of the number of stressful events experienced was used as the indicator of stress.
Interpersonal Stress
The 12-item Social Obstruction Scale (Gurley, 1990) was administered at Time 1 to assess the presence of negative social relationships with others, including being treated poorly, being ignored, and being manipulated by others (e.g., “Somebody treats me as if I were nobody”). This measure assesses interpersonal stress which may not be present in the above measure of stressful life events. The response scale ranges from “definitely false” (1) to “definitely true” (4). The responses were internally consistent among Gurley’s (1990) heterosexual youths and our LGB youths (Cronbach’s α = .85). The mean score was computed, with higher scores indicating greater levels of interpersonal stress.

Social Support from Family and Friends
Procidano and Heller’s (1983) measures of perceived social support from family and from friends were adapted, deleting items that might be confounded with psychological health. The two resulting 12-item measures, administered at Time 1 and using a yes (1) or no (0) response format, assessed the extent to which needs for support, information, and feedback were met by family and by friends (e.g., “I rely on my [family/friends] for emotional support”). A count of the items endorsed was the index of social support from family (Cronbach’s α = .90) and friends (Cronbach’s α = .80).

Psychological Distress
Symptoms of depressive and anxious distress during the past week were assessed by means of the Brief Symptom Inventory (BSI; Derogatis, 1993) at all three assessment times, using a Likert-type response scale from “not at all” (0) to “extremely” (4) distressing. The mean of each subscale was computed, with high scores indicating elevated distress. Internal consistency (Cronbach’s α) across the three assessments ranged from .80 to .82 for anxious symptoms and from .81 to .83 for depressive symptoms.

As the BSI assesses only internalized distress, we also included conduct problems as indicators of externalized psychological distress. A 13-item index was created to assess the prevalence of conduct problems experienced by the youths, such as skipping school, vandalism, stealing, fighting, and running away. Items were constructed using the conduct problems identified in DSM-III-R (American Psychiatric Association, 1987).

Potential Covariates
In addition to sex, age, SES, and ethnicity/race, we assessed the tendency to provide socially desirable responses at Time 1 by means of the Marlowe–Crowne Social Desirability scale (Crowne & Marlowe, 1964). We used its original true–false response format, but deleted 2 of 33 items we considered inappropriate for youths. A factor analysis generated 12 items that loaded on a single factor (e.g., “I have never deliberately said something that hurt someone’s feelings”). The number of these items endorsed compose our indicator of social desirability (Cronbach’s α = .74).

Data Analysis
Preliminary descriptive statistics were examined to identify the prevalence of cigarette smoking in this sample. Means and standard deviations were computed, as well as zero-order correlations among the variables. Associations between the variables of interest and potential covariates also were examined to identify covariates for which controls were needed in subsequent analyses. To examine the hypothesis that the use of tobacco smoking to cope with stress has implications for subsequent psychological distress, we conducted two separate sets of multiple linear regressions. One set examined each of the individual theoretical constructs (e.g., each type of stress separately, each type of support separately) to identify if these proposed theoretical relations are supported. Having found evidence of the theoretical relations, a second set of regression analyses was conducted in which all variables were included so as to test the overall predictive power of these variables relative to one another. In the first set of regression analyses, every psychological distress variable at Time 3 was regressed on the smoking dichotomy, one of the stressor variables, and the interaction of smoking by stress. To examine the hypothesis that the availability of other coping resources (e.g., family support) buffers the relations between smoking and psychological distress, each psychological distress variable at Time 3 was regressed on the smoking dichotomy, a social support variable, and the interaction of smoking by that support variable. In the second set, each psychological distress variable at Time 3 was regressed on the smoking dichotomy, both stressor variables, both support variables, and all of the smoking by stress and smoking by support interactions in a single hierarchical linear regression.

All regression analyses involved psychological distress at Time 3 as outcome in order to maximize the assessment of change in distress over 1 year (i.e., from Time 1 to Time 3). For all regression analyses, controls were imposed for the covariates and the comparable indicator of psychological distress at Time 1 (e.g., controls for Time 1
depression when predicting Time 3 depression; for Time 1 anxiety when predicting Time 3 anxiety). The product terms were entered hierarchically in the second step of the regression model, with all other variables entered in the first step. Before computing the product term for the interaction, we centered every component, continuous variable about its mean.

**Results**

Longitudinal assessments of cigarette smoking were available for 150 youths over the 1-year study period. Of these youths, 59 (39%) reported never smoking and 59 (39%) reported consistently smoking. Of the remaining youths, 15 (10%) had stopped smoking and 17 (11%) had started smoking during the study. Given the small number of youths who initiated or stopped smoking, these youths could not be examined separately. Therefore, all subsequent analyses were based on the 135 youths who had never smoked (0) versus those who smoked consistently or initiated smoking (1) over the three assessment periods. Because the youths who quit smoking may differ from consistent nonsmokers as well as from current smokers, they were excluded from the analysis.

Correlations among the report’s critical variables are presented in Table I. Smokers reported significantly (p < .05) more stressful life events at Time 1 and more conduct problems at Time 1 and 3. Nearly all variables at Time 1, specifically, more interpersonal stress (i.e., negative social interactions), less social support from family and friends, and more psychological distress, were correlated significantly with indicators of psychological distress at Time 3.

**Potential Covariates**

The examination of potential covariates revealed that gender was not related significantly to any of the variables of interest. However, the data indicated the need to control for age, social desirability, SES, and ethnicity/race.

Significant findings (p < .05) indicated that younger as compared with older youths were more likely to smoke (r = −.27) and reported more stressful life events (r = −.23) and more conduct problems (r = −.23) at Time 1. Youths reporting more social desirability at Time 1 reported significantly less interpersonal stress (r = −.20) and marginally more family support (r = .15, p < .10). Youths who reported more social desirability at Time 1 also reported significantly fewer symptoms of depression (r = −.23) and conduct problems (r = −.29) at Time 1 and marginally fewer symptoms of anxiety (r = −.15, p = .07) at Time 1, as well as fewer symptoms of anxiety and depression (r = −.20 and −.22, respectively) at Time 3 and marginally fewer conduct problems (r = −.15, p = .08) at Time 3. Youths from lower SES experienced more stressful life events at Time 1 (r = .22). Finally, ethnicity/race was correlated with stressful life events (p < .10), family support (p < .05), depressive symptoms (p < .10), and conduct problems (p < .10) at Time 1.

### Table I. Pearson Correlations and Descriptive Statistics (N = 135)

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<td>1. Tobacco Smokers (1)</td>
<td>0.56</td>
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<td>vs. NonSmokers (0)</td>
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<td>2. Stressful Life Events</td>
<td>7.50</td>
<td>4.84</td>
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<td>3. Interpersonal Stress</td>
<td>2.16</td>
<td>0.71</td>
<td>.11</td>
<td>.40**</td>
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<td>4. Family Support</td>
<td>6.33</td>
<td>4.05</td>
<td>−.09</td>
<td>−.13</td>
<td>−.33**</td>
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<td>5. Friend Support</td>
<td>10.13</td>
<td>2.36</td>
<td>−.13</td>
<td>−.11</td>
<td>−.18*</td>
<td>.29**</td>
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<td>6. Anxious Distress</td>
<td>1.22</td>
<td>0.92</td>
<td>.00</td>
<td>.16†</td>
<td>.36**</td>
<td>−.07</td>
<td>−.13†</td>
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<td>7. Depressive Distress</td>
<td>1.08</td>
<td>0.87</td>
<td>−.02</td>
<td>.43**</td>
<td>−.23**</td>
<td>−.35**</td>
<td>.56**</td>
<td>–</td>
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<td>8. Conduct Problems</td>
<td>1.89</td>
<td>1.58</td>
<td>.28**</td>
<td>.28**</td>
<td>.23**</td>
<td>−.11</td>
<td>−.15†</td>
<td>.28**</td>
<td>.25**</td>
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<td><strong>Time 3</strong></td>
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<tr>
<td>9. Anxious Distress</td>
<td>0.75</td>
<td>0.74</td>
<td>.13</td>
<td>.16†</td>
<td>.28**</td>
<td>−.12</td>
<td>−.11</td>
<td>.48**</td>
<td>.31**</td>
<td>.19*</td>
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<tr>
<td>10. Depressive Distress</td>
<td>0.75</td>
<td>0.75</td>
<td>.13</td>
<td>.04</td>
<td>.30**</td>
<td>−.26**</td>
<td>−.20*</td>
<td>.28**</td>
<td>.33**</td>
<td>.14</td>
<td>.63**</td>
<td>–</td>
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<tr>
<td>11. Conduct Problems</td>
<td>1.34</td>
<td>1.31</td>
<td>.20*</td>
<td>.13</td>
<td>.24**</td>
<td>−.12</td>
<td>−.19*</td>
<td>.13</td>
<td>.15†</td>
<td>.34**</td>
<td>.25**</td>
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Note. NA = Not Applicable.

†p < .10; *p < .05; **p < .01.
Follow-up, pair-wise comparisons primarily found significant ($p < .05$) differences between youths of Black or other backgrounds as compared with Hispanic and White youths. For example, Black youths reported less family support than Hispanic youths, and youths of other ethnic backgrounds reported less family support than Hispanic and White youths. Consequently, a dichotomy comparing Black and other youths with Hispanic and White youths was created and used in all subsequent, multivariate analyses.

**Stress-moderating Role of Smoking**

To examine the hypothesis that the use of tobacco smoking to cope with stress has implications for changes in subsequent psychological distress, we conducted a series of multiple linear regressions. Every psychological distress variable at Time 3 was regressed on the smoking dichotomy, one of the stressor variables, and the interaction of smoking by stress. The results of the regression analyses are presented in top half of Table II. Although smoking was rarely directly related to psychological distress, it was found to have a consistent moderating role for all three indicators of distress at Time 3. For example, smoking was found to moderate the association between stressful life events and subsequent depressive distress. Smoking was also found to moderate the associations between interpersonal stress and both subsequent anxious distress and conduct problems.

Figure 1 depicts the plot of the slopes of the stressful life events by smoking interaction, and Figure 2 depicts the plots of the slopes of the interpersonal stress by smoking interactions. Slopes were plotted following the procedures detailed by Cohen, Cohen, West, and Aiken (2003) using $+1$ SD and $-1$ SD as the sample values. All three interactions indicate that smoking amplifies the relation between any indicator of stress (i.e., stressful life events or interpersonal stress) and subsequent psychological distress. Specifically, whereas smokers and nonsmokers were very similar in their level of psychological distress under conditions of low stress, under conditions of high stress, smokers (but not nonsmokers) were found to have increased depressive distress, anxious distress, and conduct problems at Time 3 relative to nonsmokers.

**Social Support Moderates the Negative Role of Smoking**

To examine the hypothesis that the availability of other coping resources (i.e., family and friend supports) would moderate the negative impact of tobacco smoking on psychological distress, we conducted a second set of linear regressions. Specifically, each indicator of psychological distress at Time 3 was regressed on the smoking dichotomy, social support indicator, and the interaction of smoking by that support indicator.

The results of these regression analyses are presented in the middle of Table II. As before, smoking was not significantly associated with psychological distress, and social support from family or friends was not significantly

### Table II. Hierarchical Regression Models of Change in Psychological Distress

<table>
<thead>
<tr>
<th>Change Between Time 1 and Time 3</th>
<th>Anxious Distress $\beta$</th>
<th>Depressive Distress $\beta$</th>
<th>Conduct Problems $\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separate analysis of each theoretical construct</td>
<td></td>
<td></td>
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<tr>
<td>Smokers vs. Nonsmokers</td>
<td>.13</td>
<td>.12</td>
<td>.05</td>
</tr>
<tr>
<td>Stressful Life Events</td>
<td>.13</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>Smokers $\times$ Stressful Events</td>
<td>.20</td>
<td>.28*</td>
<td>.16</td>
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<tr>
<td>$\Delta R^2$ for the Interaction</td>
<td>.02</td>
<td>.03*</td>
<td>.01</td>
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<tr>
<td>Total $R^2$</td>
<td>.28***</td>
<td>.18**</td>
<td>.13*</td>
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<td>Smokers vs. Nonsmokers</td>
<td>.13</td>
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<tr>
<td>Interpersonal Stress</td>
<td>.16†</td>
<td>.22*</td>
<td>.02</td>
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<tr>
<td>Smokers $\times$ Interpersonal Stress</td>
<td>.28*</td>
<td>.09</td>
<td>.30*</td>
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<tr>
<td>$\Delta R^2$ for the Interaction</td>
<td>.03*</td>
<td>.00</td>
<td>.04*</td>
</tr>
<tr>
<td>Total $R^2$</td>
<td>.31***</td>
<td>.19**</td>
<td>.17***</td>
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<td>Smokers vs. Nonsmokers</td>
<td>.15†</td>
<td>.11</td>
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<td>Family Support</td>
<td>$-0.1$</td>
<td>$-0.15$</td>
<td>$-0.1$</td>
</tr>
<tr>
<td>Smokers $\times$ Family Support</td>
<td>$-0.42$***</td>
<td>.14</td>
<td>.31*</td>
</tr>
<tr>
<td>$\Delta R^2$ for the Interaction</td>
<td>.07***</td>
<td>.01</td>
<td>.04*</td>
</tr>
<tr>
<td>Total $R^2$</td>
<td>.36***</td>
<td>.18**</td>
<td>.18***</td>
</tr>
<tr>
<td>Smokers vs. Nonsmokers</td>
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<td>.11</td>
<td>.09</td>
</tr>
<tr>
<td>Friend Support</td>
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<td>$-0.09$</td>
<td>$-0.09$</td>
</tr>
<tr>
<td>Smokers $\times$ Friend Support</td>
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<td>.04</td>
<td>.56***</td>
</tr>
<tr>
<td>$\Delta R^2$ for the Interaction</td>
<td>.02†</td>
<td>.00</td>
<td>.09***</td>
</tr>
<tr>
<td>Total $R^2$</td>
<td>.28***</td>
<td>.16**</td>
<td>.22***</td>
</tr>
</tbody>
</table>

**Combined analysis of all constructs**

| | Smokers vs. Nonsmokers | Stressful Life Events | Interpersonal Stress | Family Support | Friend Support | Smokers $\times$ Stressful Events | Smokers $\times$ Interpersonal Stress | Smokers $\times$ Family Support | Smokers $\times$ Friend Support | $\Delta R^2$ for the Interactions | Total $R^2$ |
| | .10 | .10 | .10 | .08 | .07 | .09 | .11 | .09 | .15 | .09** | .04 | .17*** |

Note. Controls were imposed for age, SES, ethnicity/race, social desirability, and equivalent Time 1 distress variable in all regression models. Main effects and the control variables were entered in Step 1 and the interaction term was entered in Step 2. Thus, the beta weights reported for the main effects are from Step 1 and those for the interactions are from Step 2.

$\dagger p < .10; \ddagger p < .05; *** p < .01; \ddagger\ddagger p < .001$. 

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**Social Support Moderates the Negative Role of Smoking**

To examine the hypothesis that the availability of other coping resources (i.e., family and friend supports) would moderate the negative impact of tobacco smoking on psychological distress, we conducted a second set of linear regressions. Specifically, each indicator of psychological distress at Time 3 was regressed on the smoking dichotomy, social support indicator, and the interaction of smoking by that support indicator.

The results of these regression analyses are presented in the middle of Table II. As before, smoking was not significantly associated with psychological distress, and social support from family or friends was not significantly

### Table II. Hierarchical Regression Models of Change in Psychological Distress

<table>
<thead>
<tr>
<th>Change Between Time 1 and Time 3</th>
<th>Anxious Distress $\beta$</th>
<th>Depressive Distress $\beta$</th>
<th>Conduct Problems $\beta$</th>
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<tr>
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<tr>
<td>Smokers vs. Nonsmokers</td>
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<td>.05</td>
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<td>Stressful Life Events</td>
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<td>.01</td>
<td>.01</td>
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<td>Smokers $\times$ Stressful Events</td>
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<td>.16</td>
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<td>$\Delta R^2$ for the Interaction</td>
<td>.02</td>
<td>.03*</td>
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<tr>
<td>Total $R^2$</td>
<td>.28***</td>
<td>.18**</td>
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<td>$\Delta R^2$ for the Interaction</td>
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<td>Total $R^2$</td>
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| | .10 | .10 | .10 | .08 | .07 | .09 | .11 | .09 | .15 | .09** | .04 | .17*** |

Note. Controls were imposed for age, SES, ethnicity/race, social desirability, and equivalent Time 1 distress variable in all regression models. Main effects and the control variables were entered in Step 1 and the interaction term was entered in Step 2. Thus, the beta weights reported for the main effects are from Step 1 and those for the interactions are from Step 2.

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The results of these regression analyses are presented in the middle of Table II. As before, smoking was not significantly associated with psychological distress, and social support from family or friends was not significantly
associated with distress. However, the interaction between social support and smoking was significant for four of the six regression analyses. Specifically, social support from friends and social support from family were both found to moderate the association between cigarette smoking and subsequent anxious distress and conduct problems.

Figure 3 depicts the plots of the slopes of the smoking by family support interactions and Figure 4 depicts the plots of the slopes of the smoking by friend support interactions. All four used $+1 \text{ SD}$ and $-1 \text{ SD}$ as the sample

Figure 1. Stressful life events amplify the role of cigarette smoking on depressive distress

Figure 2. Interpersonal stress amplifies the role of cigarette smoking on psychological distress

Figure 3. Social support from family moderates the negative association between cigarette smoking and psychological distress

Figure 4. Social support from friends moderates the negative association between cigarette smoking and psychological distress
values. All four interactions between social support and smoking revealed that social support (from friends or family) served to buffer the negative association of smoking on psychological distress. Specifically, whereas the levels of anxious distress and conduct problems at Time 3 were similar among smokers and nonsmokers under conditions of high family support or high friend support, under conditions of low family or friend support, smokers were found to have significantly higher levels of anxious distress and conduct problems at Time 3 relative to nonsmokers.

**Combined Overall Predictive Analyses**

Having found a number of the proposed theoretical associations to be significant when tested individually (e.g., each type of stress separately, each type of support separately), further regression analyses were conducted to test the overall predictive value of each of these theoretical factors relative to one another. Specifically, all of the analyses were conducted again with smoking, both forms of stress, both forms of support, and all of the smoking by stress and smoking by support interactions in a single analysis for each psychological distress outcome. The results of these analyses are presented in the bottom of Table II.

This overall model largely replicated the findings of the earlier individual models such that there were relatively few main effects for stressful life events, interpersonal stress, family support, or friend support. Furthermore, four of the seven interactions that were significant in the individual analyses remained significant. Specifically, smoking was still found to moderate (i.e., amplify) the negative association of stressful life events on subsequent depressive distress and smoking was found to amplify the negative association of interpersonal stress on subsequent conduct problems. Likewise, as before, family support was found to buffer the negative association of smoking on subsequent anxious distress and friend support was found to buffer the negative association of smoking on subsequent conduct problems. Indeed, when the regression slopes for these interactions were plotted, they remained essentially unchanged from those found in the individual analyses as well. Therefore, only the plotted interactions from the individual analyses are presented.

**Discussion**

Given the high prevalence of cigarette smoking and psychological distress found among LGB youths (Bontempo & D’Augelli, 2002; Lee et al., 2009), this report examined the effectiveness of cigarette smoking as a strategy for coping with stress on the subsequent psychological distress of LGB youths. In contrast to some theoretical views and lay perceptions that smoking alleviates distress, the current study found that smoking amplified the negative association between both stressful events and interpersonal stressors with subsequent psychological distress, such that stressors were more strongly associated with subsequent distress among smokers than among nonsmokers. This finding, that LGB youths who smoke were less able to cope with the stressors they experienced, was found for both multiple psychological distress outcomes and multiple types of stressors. Thus, despite lay perceptions that smoking serves as an effective coping strategy to alleviate stress (at least in the short term; Nichter et al., 2007; Remafedi, 2007), the findings suggest that smoking may have long-term adverse consequences for distress.

Although LGB youths who smoke were more negatively affected by the stressors they experienced, social support from either friends or family were found to buffer the negative association between smoking and psychological distress. Specifically, although smokers who reported low levels of social support were at risk for increases in anxious distress and conduct problems over time, smokers who received high levels of social support reported levels of anxious distress and conduct problems that were similar to those of nonsmokers. These four findings not only underscore the importance of social support for psychological well-being in general, and specifically for LGB youths (Rosario, Schrimshaw, & Hunter, 2005; Ueno, 2005; Williams et al., 2005), but they also emphasize the importance of social support as a coping resource for smokers and indicate that, in the absence of social support, smoking can have adverse consequences for psychological distress. Also of interest is the finding that social support—regardless of the source (i.e., either from friends or family)—served a beneficial role; a finding that is contrary to some past work, which found that parental support is more critical than peer support for psychological adjustment (Stice, Ragan, & Randall, 2004; Young, Berenson, Cohen, & Garcia, 2005).

Although we do not know why our LGB youths began or continued to smoke, a plausible explanatory set of factors, given our findings, may include stress or low social support when considered along with the youths’ sexual identity development. Sexual identity development is difficult for many LGB youths, given society’s stigmatization of homosexuality. The stigmatization can result in problematic social relationships and fewer supportive relationships. As such, LGB youths may lack the input and guidance
from parents and other nurturing adults that other youths receive about their sexual development. In addition, LGB youths begin their sexual identity development around puberty (Rosario et al., 1996; Savin-Williams & Diamond, 2000) when coping capabilities are developmentally limited. Thus, it is unsurprising that the youths are likely to turn to maladaptive coping strategies. Smoking tobacco may be one of those strategies. Indeed, contrary to general samples, we found that younger LGB youths were more likely to smoke than older youths, suggesting that smoking may be a strategy younger youths turn to due to an absence of other coping alternatives, including potential lack of sexual-minority peers and support. Smoking may provide the sense that stress is being controlled or reduced, quiet physiological dysregulation, and even seem to keep psychological distress in check (for review, see Kassel et al., 2003). However, our data suggest that, whatever benefits exist, they are likely to be illusory or short lived. Not only does smoking not reduce psychological distress, but it actually may also increase it.

The negative potential effects of smoking tobacco cannot be sufficiently underscored. Although the long-term physical health risks of cigarette smoking have long been known (Dibble et al., 2002; Heck & Jacobson, 2006; Marshall et al., 2009; Roberts et al., 2003), our data suggest that smoking may have implications for increased psychological distress. Consequently, intervention strategies are needed to reduce the prevalence of smoking among LGB youths and adults. Those strategies may involve targeting existing smoking prevention and cessation efforts and programs to LGB youths. Alternatively, smoking prevention and cessation programs may be needed for LGB youths that specifically address the unique stressors that LGB youths confront as well as provide supportive relationships which may reduce the need to cope by means of cigarettes. Prevention efforts also may involve public or social policy efforts to reduce society’s stigmatization of homosexuality. If smoking begins as a way of coping with such stigmatization, then primary prevention efforts to reduce such stigmatization may preclude smoking among subsequent populations of LGB individuals.

This report has a number of limitations. First, the sample size is rather modest. Nevertheless, we had sufficient sample to detect medium effect sizes and we report significant findings across multiple psychological distress outcomes. Second, the sample was a convenience sample and as such, the prevalence of smoking in this sample is unlikely to generalize to the population of LGB youths. In addition, given that these data are not contemporary, the generalizability of the associations between smoking, stress, and distress to more contemporary cohorts of LGB youths may be limited. Nevertheless, given that LGB youths continue to experience stress from a variety of sources and continue to report high levels of cigarette smoking (Bontemo & D’Augelli, 2002; Lee et al., 2009; Russell et al., 2001), the associations identified here should still hold. Regardless, we encourage other researchers to replicate these findings with more contemporary samples. Third, the sample was followed only over the course of 1 year. A longer follow-up time would have been preferable and, of course, we encourage longer term assessments. In addition, the current study was a within-groups study of LGB youths and as such did not have a heterosexual comparison group. Thus, the current study could not determine whether the findings identified here are unique to LGB youths or whether similar findings may be found among heterosexual youths. We encourage future studies with heterosexual comparisons to further examine this issue. Finally, we did not inquire why the youths started and continued to smoke. Such information may have important implications for understanding the potential outcomes of smoking and for designing interventions. We certainly encourage other investigators to examine reasons for initiating and continuing to smoke (Remafedi, 2007), as well as to investigate smoking’s relations with a variety of outcomes, including its moderating relations with stress and support, given our findings and especially when coupled with the elevated prevalence of smoking among LGB populations and the negative health consequences of smoking.

Despite the limitations, these findings provide further evidence of the negative role of cigarette smoking, suggesting that cigarette smoking may exacerbate the negative effects of stress on the psychological distress of LGB youths. Given the high levels of stress, psychological distress, and low levels of social support experienced by many LGB youths, these findings provide important preliminary data on the interplay between these issues and suggest important ways in which interventions may interrupt this cycle.

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