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Relations Between Parental Distress Intolerance, Adolescent Motives for Cigarette Use, and Adolescent Cigarette Smoking Levels

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Abstract

Background—A relatively large body of evidence indicates that coping motives for cigarette smoking are associated with a number of problematic outcomes (e.g., greater smoking frequency) among adolescents. Evidence also indicates that lower distress tolerance (or higher distress intolerance) is related to higher levels of coping motives for cigarette smoking among adults and adolescents. Therefore, it is critical to improve our understanding of factors that may increase the likelihood of smoking to cope among adolescents. In addition, evidence suggests that a number of parenting behaviors may affect adolescent smoking behavior. No work to date, however, has examined the relation between parental distress intolerance and adolescent smoking motives, or adolescent smoking behavior.

Objective/methods—The current study involving adolescents ($n = 46$) and one of their parents aimed to address this gap in the literature by examining the association between parent-reported parental distress intolerance, self-reported adolescent motives for cigarette use, and self-reported adolescent cigarette smoking levels.

Results—Results indicated that parental distress intolerance was related to greater adolescent coping motives for cigarette smoking, but not to other motives for adolescent cigarette use. Furthermore, results indicated that parental distress intolerance was indirectly associated with higher adolescent cigarette smoking levels through adolescent coping motives for cigarette smoking.

Conclusions—Parental distress intolerance is associated with coping motives for adolescent cigarette smoking. This suggests parental emotional factors may be associated with adolescent cigarette use.

Keywords

Adolescents; coping motives; cigarettes; distress intolerance

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Cigarette smoking is prevalent among adolescents, with 20% of 10th graders reporting that they have tried cigarettes, and 6.3% reporting that they have smoked cigarettes in the past 30 days (Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2016). Furthermore, 87% of adult cigarette smokers initiated smoking by the age of 18 (United States Department of Health and Human Services, 2014). In addition, cigarette smoking is the leading preventable cause of death in the United States (Centers for Disease Control & Prevention, 2012). Therefore, it is critical to improve our understanding of reasons that adolescents report for smoking cigarettes (i.e., smoking motives).

Smoking motives are proximal risk factors thought to increase risk for cigarette smoking by mediating the association between distal risk factors such as psychopathology (e.g., posttraumatic stress disorder; Mahaffey et al., 2016) or emotional processes (e.g., anger; Mischel et al., 2016) and the behavior of cigarette smoking. Motives, therefore, represent a potential risk factor for adolescent cigarette smoking that can be targeted for intervention efforts. A number of motives for adolescent cigarette use have been identified including coping (e.g., "to help me forget my worries"), conformity (e.g., "to fit in with the group I like"), social (e.g., "to be sociable"), and enhancement motives (e.g., "because I like the feeling;" Comeau, Stewart, & Loba, 2001). Coping motives may be particularly important to consider during adolescence, given their links to problematic smoking behavior. For example, among early stage smokers, daily smokers report higher coping motives for cigarette smoking than occasional smokers (Mathew et al., 2014). In addition, adolescent coping motives for cigarette use longitudinally predict increases in cigarette use and dependence across 15 months (Weinstein & Mermelstein, 2013). Taken together, evidence suggests that adolescent coping motives for cigarette use are a common and problematic motive for cigarette use among adolescents. It is therefore critical to identify factors that may be associated with adolescent coping motives for cigarette use.

Distress tolerance, or the perceived ability and behavioral act of tolerating negative psychological and physical states (Leyro, Zvolensky, & Bernstein, 2010; Simons & Gaher, 2005), has been repeatedly linked to adult smoking outcomes (e.g., Brown, Lejuez, Kahler, Strong, & Zvolensky, 2005; Brown et al., 2009). Little, however, is known about the relation between distress tolerance and cigarette smoking in youth. Distress tolerance has been linked to both internalizing and externalizing symptoms during adolescence (Cummings et al., 2013). There are a number of reasons to believe that distress tolerance may be implicated in the onset and maintenance of adolescent smoking behavior. In particular, a negative reinforcement approach has been utilized to understand distress tolerance's relation to various forms of psychopathology (Daughters, Gorka, Rutherford, & Mayes, 2014). Negative reinforcement refers to the motivation to avoid or escape negative emotional states (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004), and it has been implicated in the relation between distress tolerance and substance use (Leyro et al., 2010). Indeed, emotion regulation among adolescents low in distress tolerance is characterized by maladaptive efforts to avoid or alleviate negative emotional states (Wolitzky-Taylor et al., 2015, 2016). This suggests that distress tolerance may be an important construct to consider with respect to adolescent coping motives for cigarette use. Specifically, adolescents who are low in distress tolerance are likely to perceive distressing experiences as more aversive than adolescents with a

relatively higher level of distress tolerance. Therefore, these adolescents may be particularly motivated to seek out behaviors that are associated with the avoidance or reduction of negative affect, such as cigarette smoking (Leyro et al., 2010). Consistent with this notion, evidence suggests that among adolescent smokers, lower levels of distress tolerance are associated with a steeper increase in negative affect reduction expectancies for cigarette use longitudinally (Shadur, Ninnemann, Lim, Lejuez, & MacPherson, 2017).

In addition to adolescent vulnerabilities for cigarette use, parents also play an important role in adolescent cigarette use behaviors (Hiemstra, de Leeuw, Engels, & Otten, 2017).

Although very little work has examined parental factors that are associated with specific adolescent motives for cigarette use, a number of parental factors have been linked to the onset and maintenance of adolescent cigarette smoking. For example, progeny of parents who smoke cigarettes are significantly more likely to smoke cigarettes themselves than youth of parents who do not smoke (Goodwin, Lewinsohn, & Seeley, 2005). Critically, beyond broadband associations between parent and adolescent smoking behavior, scholars have identified two types of parenting that can influence adolescent smoking behavior. Specifically, both general parenting practices (e.g., parental warmth and control) and smoking-specific parenting practices (e.g., the quality of communication between parents and adolescents about smoking; Harakeh, Scholte, Vermulst, de Vries, & Engels, 2010) are linked to adolescent smoking behavior. For example, adolescents who perceive their parents as being highly supportive report that they have higher quality conversations about cigarette smoking with their parents (i.e., respectful and open dialogues), which are associated with lower levels of adolescent smoking behavior (Harakeh et al., 2010). Furthermore, adolescents who view parents as having authority over adolescent cigarette use are significantly less likely to smoke cigarettes than adolescents who do not perceive parents as having authority over cigarette use (Jackson, 2002). Critically, adolescent smokers are particularly likely to smoke cigarettes to manage stress, particularly interpersonal and familial stress (Scales, Monahan, Rhodes, Roskos-Ewoldsen, & Johnson-Turbes, 2009). This line of evidence suggests that the quality and content of parental communication about cigarette use may be important in influencing adolescent smoking behavior. Less work has been done to identify parental emotional characteristics that may influence the course of cigarette smoking among adolescents (e.g., adolescent smoking motives). This is a major gap in the literature, as scholars have theorized that parents may confer their sons and/or daughters with broadband vulnerabilities that increase the risk of cigarette smoking during adolescence (Goodwin et al., 2005; Patton et al., 1996).

In particular, parental distress tolerance may be an important factor to consider in regard to adolescents' coping motives for cigarette smoking. A relatively large body of work suggests that parents may play an active role in shaping adolescent emotion regulation efforts (Morris, Silk, Steinberg, Myers, & Robinson, 2007). In light of the fact that cigarette smoking is strongly associated with negative affect reduction (Kassel, Stroud, & Paronis, 2003), it is likely that parental distress tolerance may influence adolescent motivation to use cigarettes to cope with negative affect. Furthermore, maternal distress tolerance has been linked to adolescent daughter's distress tolerance, suggesting a shared familial vulnerability (Daughters et al., 2014). In addition, a limited body of work suggests that parents' ability to tolerate adolescent distress may affect parenting behaviors. For example, research indicates

that when mothers who have difficulty tolerating their youth's distress are confronted with an inconsolable infant, they display less interest in their infant's mental well-being than mothers who are relatively more able to persist in the face of their progeny's distress (Rutherford, Goldberg, Luyten, Bridgett, & Mayes, 2013). This suggests that in the presence of adolescent distress, parents who have difficulty tolerating distress, particularly their adolescent's distress, may be less likely to intervene and help their youth manage their affect effectively. Thus, adolescents may be left to learn how to manage negative affect without adequate parental guidance. Additionally, observations of parental emotion regulation efforts are one way in which youth learn to manage their own emotions (Morris et al., 2007). Therefore, it stands to reason that parents who are more intolerant of distress may serve as models for their youth, which contribute, to the development of avoidance-based strategies for managing distress. This could result in their adolescents being more motivated to use substances, such as cigarettes, in efforts to cope with unpleasant feelings. Indeed, recent preliminary evidence suggests that parents of adults with substance dependence demonstrate lower levels of distress tolerance (i.e., higher levels of distress intolerance) than parents of healthy controls (Ekinci & Kural, 2017). Taken together, evidence converges to suggest that parental factors, such as parental distress intolerance, might influence more proximal, intermediary factors (e.g., adolescent smoking motives), which in turn may lead to a downstream increase in the risk for adolescent cigarette use. Absent from the literature, however, is an examination of how parental distress intolerance may relate to vulnerabilities for cigarette smoking in adolescents, particularly adolescents' motives for cigarette use.

Therefore, to address this gap in the literature, one goal of the current study was to examine if parental distress intolerance is related to adolescent motives for cigarette use. Another aim of the study was to examine how these factors may relate to the frequency of adolescent cigarette use. A number of hypotheses guided the current study. First, it was hypothesized that parent-reported parental distress intolerance would be associated with greater self-reported adolescent coping motives for cigarette smoking, but not with other self-reported adolescent smoking motives (i.e., enhancement, social, and conformity motives). Because adolescent gender (e.g., Branstetter, Blosnich, Dino, Nolan, & Horn, 2012), parental smoking (e.g., Goodwin et al., 2005), and adolescent anxiety (e.g., Comeau et al., 2001) may play important roles in adolescent smoking behavior, these variables were entered as covariates in order to provide a conservative test of the first set of hypotheses. Second, it was hypothesized that parental distress intolerance would be indirectly associated with adolescent cigarette smoking levels through its relationship with adolescent coping motives for cigarette smoking.

Method

Participants

Forty-six teenagers ($n=29$ females) between the ages of 13 and 17 years old ($M_{\text{age}} = 15.76$; $SD=1.11$) and their mother or father ($n=34$ females) were drawn from a larger, prospective study of treatment-seeking adolescents ($N=380$) enrolled in residential treatment. The racial and ethnic composition of the adolescents in this sample was as follows: 84.8% White/Caucasian, 4.3% Black/African American, 2.2% Asian American, 4.3% Hispanic/Latino,

4.3% Other. See Table 1 for additional adolescent and adult sample characteristics, including adolescent and parent smoking characteristics.

Parent measures

Demographics—Parents completed a series of standard demographic questions, including items on age, gender, race/ethnicity, income, and marital and caregiver status.

Parental distress intolerance—The 15-item Distress Tolerance Scale (DTS; Simons & Gaher, 2005) was utilized to assess parental distress intolerance. Participants rated items such as “I can’t handle feeling distressed or upset” on a 5-point scale (1=*strongly disagree* to 5=*strongly agree*), with the item scaling in the opposite direction than usual in order to convert distress tolerance to distress intolerance. The DTS is a psychometrically sound instrument (Simons & Gaher, 2005) that has been used successfully with both clinical (Semcho, Bilsky, Lewis, & Leen-Feldner, 2016) and non-clinical (Zvolensky et al., 2009) samples. The internal consistency of the DTS in the current sample was excellent ($\alpha = .84$).

Parental cigarette smoking—Parent smoking status was assessed by a single dichotomous item. Similar to prior research (Sansores, Villalba-Caloca, Herrera-Kiengelher, Soriano-Rodríguez, & Ramírez-Venegas, 1999), parents were asked, “Do you smoke cigarettes?” Response options included “yes” (coded as 1) or “no” (coded as 0).

Adolescent measures

Demographics—Adolescents completed a series of standard demographic questions, including items on age, gender, race/ethnicity, and grade.

Adolescent smoking motives—*The Teen Smoking Motives Questionnaire* (TSMQ; Comeau et al., 2001) is a 20-item questionnaire that measures four motives for cigarette use (i.e., social, conformity, enhancement, and coping motives). Frequency of specific motives for cigarette smoking (e.g., “to forget about your problems”) were each measured on a 5-item subscale using a Likert scale ranging from 1 (*almost never/never*) to 5 (*almost always/always*). The 20-item TSMQ evidences good psychometric properties, including criterion-related validity in predicting adolescent smoking behavior (Comeau et al., 2001). Internal consistency for the motives subscales in the current study ranged from poor for the Conformity motives subscale ($\alpha = .64$) to good for the Coping ($\alpha = .84$), Social ($\alpha = .82$), and Enhancement subscales ($\alpha = .88$).

Adolescent smoking level—Adolescents were asked to rate cigarette use using a single question from the well-established Adolescent Alcohol and Drug Involvement Scale (Moberg & Hahn, 1991). Adolescents were asked to rate their cigarette use on a frequency scale ranging from 0 (*never used*) to 7 (*several times a day*). This measure has good psychometrics and is commonly used with adolescents (e.g., Cloutier et al., 2016; Mason et al., 2017).

Adolescent anxiety—The well-validated *Revised Child Anxiety and Depression Scale* (RCADS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000) was used to assess adolescent

anxiety. Adolescents used a 4-point Likert-type scale (0=*never* to 3=*always*) to rate the frequency with which they experience RCADS items related to anxiety (e.g., “I worry when I think I have done poorly at something”), which comprise five subscales: Separation Anxiety Disorder, Social Phobia, Obsessive-Compulsive Disorder, Panic Disorder, and Generalized Anxiety Disorder. As in prior work (Esbjorn, Somhøvd, Turnstedt, & Reinholdt-Dunne, 2012; Kesters, Chinapaw, Zwaanswijk, van der Wal, & Koot, 2015), the 37-item scores from the five anxiety-related subscales were summed to create a total score for adolescent anxiety (RCADS Anxiety). The RCADS has demonstrated good psychometric properties (Chorpita et al., 2000) and has previously been used successfully with substance-using adolescents (Cloutier, Blumenthal, & Mischel, 2016; Pang, Guillot, Zvolensky, Bonn-Miller, & Leventhal, 2017). Internal consistency for RCADS Anxiety in the current sample was excellent ($\alpha = .94$).

Procedures

After participants provided written informed consent, questionnaires were completed in a private space with a researcher on hand to answer questions. Parents and adolescents completed questionnaires separately.

Analytic approach

First, a series of bivariate correlations were conducted to examine the association between primary variables of interest (e.g., parental distress intolerance, adolescent smoking motives) and relevant demographics (e.g., adolescent age). Differences between primary variables of interest and adolescent gender were examined using independent samples *t*-tests. Second, a series of four hierarchical regressions were conducted to test whether parental distress intolerance would be associated with coping motives for cigarette smoking but not with enhancement, social, or conformity motives. The outcome variable for each regression was either coping, enhancement, social, or conformity smoking motives. Covariates (i.e., gender, parental smoking status, and adolescent anxiety) were entered in Step 1, and the primary predictor variable (i.e., parental distress intolerance) was entered in Step 2. This approach was used to test the relative, or incremental, predictive validity of parental distress intolerance relative to all covariates (Haynes & Lench, 2003; Sechrest, 1963). In order to control for family wise error, a Bonferroni correction was employed. The adjusted *p* threshold for the regression analyses was $p < .013$ (.05/4). Lastly, Hayes' PROCESS macro for SPSS was used to test the indirect effect of parental distress intolerance on adolescent cigarette smoking levels through adolescent coping motives (Hayes, 2013). As recommended by Hayes (2013), 5,000 bootstrapping samples were used to test the indirect effect, which was considered statistically significant if the bias-corrected 95% confidence interval (CI) for the indirect effect excluded zero. Also as recommended by Hayes (2009), a significant total effect of parental distress intolerance on adolescent smoking levels was not required to analyze the indirect effect model.

Results

Descriptive analyses and bivariate correlations

See Tables 2 and 3 for bivariate correlations and descriptive statistics. As expected, RCADS-Anxiety and parental distress intolerance scores were positively correlated with coping motives for cigarette smoking. Adolescent smoking levels were correlated with coping, enhancement, and conformity motives for cigarette smoking but were not correlated with social motives for cigarette smoking. Adolescent age was not significantly related to any predictor or criterion variables.

Primary hypothesis tests

Hierarchical regression models for parental distress intolerance as a predictor of each form of adolescent cigarette smoking motives are shown in Table 4. Results of the initial hierarchical regression analyses controlling for adolescent gender, parental smoking status, and adolescent anxiety were statistically significant for coping and enhancement motives, but not social or conformity motives. The total amount of variance each full model accounted for was: 23.2% for coping, 8.4% for social, 12.0% for enhancement, and 3.7% for conformity smoking motives. Covariates in Step 1 did not account for a significant amount of variance in any of the adolescent smoking motives after applying the Bonferroni correction. Parental distress intolerance in Step 2 accounted for a significant amount of variance in coping, but not other adolescent smoking motives.

The total effect and indirect effect models are displayed in Figure 1 and Table 5. Results indicated that parental distress intolerance was a significant predictor of adolescent coping motives for smoking ($b = 0.63$, $SE = 0.21$, $p = .005$), and that coping motives were a significant predictor of adolescent smoking levels ($b = 0.61$, $SE = 0.27$, $p = .030$). Though the total effect of parental distress intolerance on adolescent smoking levels was not statistically significant ($b = 0.40$, $SE = 0.40$, $p = .322$), the indirect effect of parental distress intolerance on adolescent smoking levels through adolescent coping motives for smoking was statistically significant ($b = 0.40$, $SE = 0.40$, 95% CI: 0.06, 1.00; completely standardized indirect effect = 0.14, 93% of the total effect). Together, parental distress intolerance and adolescent coping motives for smoking accounted for 12.5% of the variance in adolescent smoking level which approached, but did not reach, statistical significance ($p = .057$).

As a test of specificity, a reverse indirect effect model was run in which the indirect effect of adolescent smoking level on parental distress intolerance through adolescent coping motives for cigarette smoking was run. The indirect effect of adolescent smoking level on parental distress intolerance through adolescent coping motives for cigarette smoking was not statistically significant ($b = 0.00$, $SE = 0.01$, 95% CI: 0.00, 0.03).

Discussion

Improving our understanding of factors that motivate adolescents to smoke cigarettes (i.e., smoking motives) is important because this may help bolster efforts to prevent and reduce adolescent smoking and related consequences. A large body of research indicates that

adolescents often use cigarettes to cope with negative affect (e.g., Cloutier et al., 2016; Henker, Whalen, Jamner, & Delfino, 2002). Furthermore, prior evidence suggests that broadband emotional vulnerabilities, such as distress intolerance (or low distress tolerance), may be related to coping-oriented cigarette smoking in adolescents (Shadur et al., 2017). Critically, a number of parental factors have been linked to adolescent cigarette use (e.g., parental warmth, quality of parental communication about cigarette use; Harakeh et al., 2010); however, no prior study had examined relations between parental distress intolerance, adolescent motives for cigarette use, and adolescent cigarette use frequency. Therefore, the current study aimed to address this gap in the literature by investigating relations between parental distress intolerance, adolescent motives for cigarette smoking, and adolescent smoking levels.

A number of noteworthy findings emerged. First, and consistent with the initial set of hypotheses, parental distress intolerance was related to greater adolescent coping motives for cigarette use, this effect was medium in magnitude ($f^2 = 0.15$; Selya, Rose, Dierker, Hedeker, & Mermelstein, 2012). Specifically, parental distress intolerance was related to greater adolescent coping motives for cigarette smoking, such that parents who reported more difficulty tolerating distress tended to have adolescents who reported stronger motivation to smoke cigarettes to cope with negative affect. This relation showed specificity, parental distress intolerance was not related to any other adolescent motives for cigarette smoking (i.e., social, conformity, or enhancement motives). Although prior work suggested that adolescent distress intolerance is associated with adolescent coping-oriented cigarette use (Shadur et al., 2017), current findings extend this work by revealing that *parental* distress intolerance is associated with adolescent coping motives for cigarette use. Notably this association was significant after controlling for a number of theoretically relevant covariates, including parental smoking status, adolescent gender, and adolescent anxiety.

Second, also consistent with hypotheses, parental distress intolerance was indirectly associated with adolescent cigarette smoking levels through its relationship with adolescent coping motives for cigarette use. The effect size for this indirect association (completely standardized indirect effect = 0.14) was small (but not negligible) in magnitude (Cheung, 2009). This suggests a pathway through which parental distress intolerance may increase the frequency of adolescent cigarette smoking. Although parental distress intolerance was not directly related to the frequency of adolescent cigarette smoking at a statistically significant level ($\beta = .15, p = .32$), parental distress intolerance was positively associated with adolescent motivation to use cigarettes to cope ($\beta = .41, p = .005$), which in turn was related to adolescent cigarette smoking frequency ($\beta = .35, p = .030$). These data suggest that parental distress intolerance may be related to proximal risk factors (e.g., adolescent coping motives for smoking) that increase the risk for distal cigarette smoking behaviors (e.g., adolescent cigarette smoking frequency).

Though at first glance the lack of a statistically significant direct association between parental distress intolerance and adolescent cigarette smoking frequency in the current study may seem to contrast with a prior study of adults (Ekinici & Kural, 2017) in which higher levels of parental distress intolerance were directly related to having adult children with

substance dependence, there are a number of notable difference between the two studies. First, the prior adult study compared the substance dependent patients' parents, 50% of whom were diagnosed with at least one DSM-IV-TR Axis I disorder, to a healthy control group that was screened for DSM-IV-TR Axis I disorders. Furthermore, the substance dependent patients' parents with Axis I disorders were shown to have higher levels of distress intolerance than the substance dependent patients' parents with no Axis I disorders. Hence, in the prior study of adults (Ekinici & Kural, 2017), the higher levels of parental distress intolerance in substance dependent patients' parents versus healthy controls may have been primarily related to the presence of Axis I disorders in the substance dependent patients' parents. Thus, it is possible that, similar to the current study of adolescents, in the prior study of adults (Ekinici & Kural, 2017) parental distress intolerance was largely indirectly related to having progeny with substance dependence through its relationship with a vulnerability factor (e.g., presence of a mood and/or anxiety disorder) related to substance use behaviors. In addition, the prior study of adults included only male patients. Due to the relatively small sample of adolescents in the current study ($N = 46$), running regression and indirect effect models by gender would not have been statistically justified. It is possible, that if the current sample been larger, then a statistically significant direct association between parental distress intolerance and adolescent cigarette smoking levels would have been detected. Future work should endeavor to examine these relations among a larger sample of adolescent cigarette smokers.

Current findings add to a growing literature demonstrating that broad parental emotional vulnerabilities, such as distress intolerance, may be related to problematic offspring outcomes (e.g., Daughters et al., 2014; Ekinici & Kural, 2017), and they lend preliminary insight into the developmental processes through which parents may confer risk for adolescent cigarette use. More specifically, current findings suggest that parents with less ability to tolerate distress may indirectly intensify adolescent cigarette use by enhancing adolescent motivation to smoke cigarettes to cope. Future work could be strengthened by including both self-report and behavioral measures of parental distress tolerance in examining associations with adolescent motives for cigarette smoking. For example, this might include additionally evaluating parental mirror tracing (a fully computerized behavioral measure of distress tolerance; Leyro et al., 2010) and investigating its association with adolescent motives for cigarette use. Behavioral measures of distress tolerance could circumvent biases inherent in self-report (Nisbett & Ross, 1980). Furthermore, multi-method assessments of parental distress tolerance (i.e., self-reported and behavioral), could allow for a more refined examination of the relations between parental distress intolerance and adolescent motives for cigarette smoking.

A critical next step will be to improve our understanding of *how* parental distress intolerance comes to be related to adolescent coping motives for cigarette smoking. Theories of emotion regulation suggest that observations of parental emotion regulation efforts are one way in which youth learn to manage their own affect (Morris et al., 2007). Although the regulation of affect and the ability to tolerate distress represent distinct processes, they are closely related constructs (Zvolensky, Vujanovic, Bernstein, & Leyro, 2010). Therefore, it is possible that a chain of influence may be at play in which parental distress intolerance is linked to adolescent distress intolerance, and then further to adolescent coping motives for

cigarette smoking, and ultimately adolescent cigarette smoking behaviors. However, experimental and longitudinal designs are needed to determine if parental distress intolerance prospectively predicts adolescent distress intolerance and cigarette smoking motives and behaviors. For example, both self-reported and behavioral parental and adolescent distress tolerance (e.g., mirror tracing and breath-holding duration; Leyro et al., 2010) and smoking-related (and other substance-related) variables could be assessed in sessions that include an experimental component when offspring are 12–13 years old. Critically, 12–13 years old is an age range during which the prevalence of current cigarette smoking is barely above 1% (US Department of Health and Human Services, 2014, p. 709). Next, the adolescent cohort and their parents could be assessed longitudinally throughout the teens' high school years (perhaps in annual waves) to track potential changes in parental and adolescent distress tolerance and adolescent cigarette smoking motives and behaviors (as well as other substance use).

A number of study limitations merit consideration. First, this study did not assess adolescent distress intolerance. Evidence suggests that maternal distress tolerance may be related to distress tolerance among daughters (Daughters et al., 2014), and that adolescent distress tolerance is predictive of adolescent negative affect reduction expectancies for cigarette smoking (Shadur et al., 2017). Therefore, as theorized above, it may be the case that low adolescent distress tolerance may mediate the relationship between low parental distress tolerance and greater adolescent coping motives for cigarette use. Future work should endeavor to disentangle these relations and examine multiple potential mediators of the relation between parental distress tolerance and adolescent coping motives for cigarette use. Second, this study utilized a cross-sectional design. While the current cross-sectional findings provide useful preliminary evidence of relations between parental distress intolerance, adolescent coping motives for cigarette use, and adolescent smoking levels, they preclude causal inferences and inferences about how these variables relate to one another over time (Kraemer, Yesavage, Taylor, & Kupfer, 2000). Of note, however, the reverse indirect effect model that was tested was nonsignificant, which provides some additional support for the hypothesized pathway. Nonetheless, future work would benefit from experimentally and longitudinally examining these processes to assess how parental distress tolerance, adolescent motives for cigarette use, and adolescent smoking levels may relate over time. Third, this sample was composed primarily of relatively affluent, Caucasian adolescents who were enrolled in a residential treatment program, and their parents. In order to improve the generalizability of these findings, future work would benefit from examining these processes in more diverse and ethnically varied samples. For example, evidence suggests that among adult women, race and distress tolerance interact, such that African American women with lower levels of distress tolerance are at an increased risk of cigarette smoking relative to White women with low levels of distress tolerance (Dahne et al., 2014). Therefore, it will be important to consider the role of race in the relation between parental distress tolerance and adolescent smoking processes. Fourth, the parents in this sample were primarily consisted of mothers. Given the critical role that fathers play in smoking initiation and maintenance (Ali & Dean, 2015), future work would benefit from examining these relations in samples that include more fathers. Finally, the current sample was relatively small (46 adolescents and one of their parents). Although this sample is useful as an initial

investigation of relations between parental distress intolerance and adolescent cigarette smoking motives and levels, future work would benefit from including a larger sample of adolescents.

Despite these limitations, the current study extends the literature by examining relations between parental distress intolerance, adolescent motives for cigarette use, and adolescent smoking levels. Current findings indicated that parental distress intolerance was associated with greater adolescent coping motives for cigarette smoking but not with other adolescent smoking motives (i.e., enhancement, social, and conformity). Furthermore, results suggested that parental distress intolerance is indirectly associated with higher adolescent cigarette smoking levels through greater adolescent coping motives for cigarette use.

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Figure 1.

The total effect and indirect effect models. Top: The total effect of parental distress intolerance on adolescent cigarette smoking levels. Bottom: The indirect effect model with adolescent coping motives for cigarette smoking examined as a potential factor accounting for the relation between parental distress intolerance and adolescent cigarette smoking levels. Unstandardized path coefficients are displayed, with the corresponding standardized regression coefficients (β s) in parentheses. The indirect effect = .14 (expressed as β). The total effect (c) = the sum of the indirect effect ($a \times b$) and the remaining direct effect (c'). * $p < .05$, ** $p < .01$.

Table 1.

Descriptive data for parent and child demographic variables.

	<i>M or n</i>	<i>SD or %</i>
<i>Parent n = 46</i>		
Gender (Male)	12	26.1%
Annual family income per year		
Less than \$20,000	2	4.3%
\$20,100–\$40,000	1	2.2%
\$41,000–\$60,00	4	8.7%
\$61,000–\$70,000	2	4.3%
\$71,000–\$90,000	2	4.3%
\$90,000–\$100,000	6	13.0%
More than \$100,000	29	63.0%
Marital status		
Single	4	8.7%
Married	28	60.9%
Divorced	11	23.9%
Separated	2	4.3%
Other	1	2.2%
Do you smoke? (Yes)	2	4.3%
<i>Offspring n = 46</i>		
Gender (Male)	17	37.0%
Age	15.76	1.11
Education		
7th	1	2.2%
9th	6	15.0%
10th	19	41.2%
11th	11	23.9%
12th	10	21.7%
Tobacco history		
Tried once	4	8.7%
Several times a year	9	19.6%
Several times a month	5	10.9%
Weekends only	11	23.9%
Several times a week	4	8.7%
Daily	13	28.3%

Table 2.

Correlations for continuous predictor and criterion variables.

	1	2	3	4	5	6	7	8
Adolescent age	1	.172	-.089	.137	.339	.108	.317	.255
RCADS Anxiety		1	.019	.113	.037	.027	.080	.470***
Parental distress intolerance			1	.149	.218	.093	.075	.411**
Adolescent smoking level				1	.110	.382**	-.303*	.353*
TMSQSo					1	.474**	.199	.319*
TMSQEn						1	-.029	.454**
TMSQCn							1	-.032
TMSQCP								1

Parental distress intolerance: Distress Tolerance Scale with the items reverse scored; RCADS Anxiety: Revised Child Anxiety and Depression Scale – Anxiety total score; TMSQSo: Teen Smoking Motives Questionnaire – Social motives subscale; TMSQEn: Teen Smoking Motives Questionnaire – Enhancement motives subscale; TMSQCn: Teen Smoking Motives Questionnaire – Conformity motives subscale; TMSQCP: Teen Smoking Motives Questionnaire – Coping motives subscale.

* $p < .05$

** $p < .01$.

^aBoys' scores are significantly greater than girls.

Table 3.

Means of predictor and criterion variables with gender differences noted.

	<i>M</i> _{girls} (<i>SD</i>)	<i>M</i> _{boys} (<i>SD</i>)	<i>M</i> _{total} (<i>SD</i>)
Adolescent age	15.79 (1.14)	15.71 (1.11)	15.76 (1.11)
RCADS Anxiety	32.07 (18.14)	26.41 (16.70)	29.98 (17.65)
Parental distress intolerance	1.18 (0.62)	2.05 (0.68)	1.93 (0.64)
Adolescent smoking level	4.69 (1.63)	5.24 (1.86)	4.89 (1.72)
TMSQSo	1.68 (0.76)	1.95 (0.96)	1.78 (0.84)
TMSQEn	2.52 (1.11)	3.28 (1.11) ^a	2.80 (1.16)
TMSQCn	1.15 (0.31)	1.16 (0.23)	1.16 (0.28)
TMSQCp	2.13 (0.92)	2.51 (1.06)	2.29 (0.98)

Parental distress intolerance: Distress Tolerance Scale with the items reverse scored; RCADS Anxiety: Revised Child Anxiety and Depression Scale – Anxiety total score; TMSQSo: Teen Smoking Motives Questionnaire – Social motives subscale; TMSQEn: Teen Smoking Motives Questionnaire – Enhancement motives subscale; TMSQCn: Teen Smoking Motives Questionnaire – Conformity motives subscale; TMSQCp: Teen Smoking Motives Questionnaire – Coping motives subscale.

^aBoys' scores are significantly greater than girls.

Table 4.

Hierarchical regression models for parental distress tolerance as a predictor of each form of adolescent cigarette smoking motives.

	<i>R</i> ²	<i>β</i>	<i>t</i>	<i>p</i>
<i>Outcome variable: coping motives</i>				
Step 1				
Adolescent gender		-.20	-1.24	.220
Parent smoking status		-.10	-0.61	.548
Adolescent anxiety		.21	1.36	.182
Step 2	0.14**			
Parental distress intolerance		.38	2.73	.009**
<i>Outcome variable: enhancement motives</i>				
Step 1	0.12			
Adolescent gender		-.36	-2.35	.023
Parent smoking status		.10	0.64	.527
Adolescent anxiety		.10	0.66	.511
Step 2	0.00			
Parental distress intolerance		.05	.356	.724
<i>Outcome variable: social motives</i>				
Step 1	0.04			
Adolescent gender		-.21	-1.29	.204
Parent smoking status		.12	0.73	.471
Adolescent anxiety		.09	0.56	.580
Step 2	0.04			
Parental distress intolerance		.21	1.37	.180
<i>Outcome variable: conformity motives</i>				
Step 1	0.03			
Adolescent gender		-.09	-0.53	.599
Parent smoking status		.16	0.10	.324
Adolescent anxiety		.12	0.75	.457
Step 2	0.01			
Parental distress intolerance		.08	0.53	.600

Parental distress intolerance: Distress Tolerance Scale with the items reverse scored. For adolescent gender (1 = *male*, 2 = *female*).

*
p < .05

**
p < .01.

Individual variable contributions in each of the regression analyses examining the hypothesized indirect effects models.

Table 5.

	B	SE	t	p
<i>Dependent variable: adolescent coping motives for cigarette smoking; test of pathway A</i>				
Parental distress intolerance	0.63	0.21	2.99	.005**
<i>Dependent variable: adolescent smoking level; test of pathway C</i>				
Parental distress intolerance	0.40	0.40	1.00	.321
<i>Dependent variable: adolescent smoking level; test of pathways C' and B</i>				
Adolescent coping motives	0.61	0.27	2.25	.030*
parental distress intolerance	0.01	0.42	0.03	.974

* $p < .05$

** $p < .01$.