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Parent-Child Conflict and Drug Use in College Women: A Moderated Mediation Model of Self Control and Mindfulness

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Abstract

This cross-sectional study examined the association between parent-child conflict and illicit drug use in a sample of female college students ($N = 928$). The mediating roles of self-control and mindfulness, as well as an interaction between self-control and mindfulness, were examined in a moderated mediation model for the purposes of expanding etiological theory and introducing targets for the prevention and treatment of drug abuse. Whereas deficits in self-control were found to facilitate the positive relation observed between parent-child conflict and the likelihood of experiencing drug-related problems, an interaction between mindfulness and self-control helped explain the association between parent-child conflict and intensity of drug-related problems. Parent-child conflict was related to low mindfulness when self-control was low, and low mindfulness in turn was related to a higher intensity of drug-related problems. This association did not exist for women with high self-control. Findings are consistent with developmental research on the etiology of drug use and the protective properties of mindfulness and self-control. Mindfulness as a potential target of intervention for drug users with low self-control to prevent drug-related problems is explored.

Keywords

mindfulness; parent-child; drug; self-control; college women

Drug use on college campuses is a national health concern (Caldeira et al., 2008; Rimsza & Moses, 2005). The use of marijuana and other illicit drugs during college is associated with

a host of negative outcomes, including death by overdose, substance use disorders and negative health and injury outcomes post-college (Dennhardt & Murphy, 2013; Caldeira et al., 2008; Caldeira, O'Grady, Vincent, & Arria, 2012). In addition, chronic substance abuse by college students is linked to discontinuous enrollment in college (Arria et al., 2013a) as well as higher rates of unemployment after college (Arria et al., 2013b). Due to the wide range of drug usage on college campuses, understanding factors which drive drug use and drug-related problems can focus preventative efforts and identify areas for targeted intervention.

One well-established risk factor for drug use in adolescence is problematic family environments (Skeer et al., 2011; Ledoux & Ledoux, 2002). Research into this association among young adult samples such as college students, however, is noticeably absent (see Dennhardt & Murphy, 2013 for a review). Although there has been an increased focus on the unique developmental needs of young people during emerging adulthood (Arnett, 2000), little attention is given to drug use-related risk and resiliency factors for this population that stem from the family environment. Nevertheless, evidence from alcohol studies suggests the importance of family factors; for example, parent-child conflict reported by college students is associated with longitudinal increases in negative alcohol-related consequences (Turner, Larimer, & Sarason, 2000). The current study therefore focuses on the association between parent-child conflict and drug-related problems in a sample of late adolescent and early adult college students. To understand the mechanisms of these associations and introduce possible targets for intervention, we link developmental theory with findings from the substance abuse treatment literature and construct a model of moderated mediation. Moreover, we limit our sample to college women because there is a dearth of research related to drug use in this group, and evidence to suggest these mechanisms are most salient for women.

Parent-child conflict and drug use: A transactional model

Growing up in a stressful family environment contributes to the development of less adaptive coping strategies and personality functioning in young people. Theorists describe this casual theory of adolescent drug use using a transactional model; the effect of family factors, including parent-child conflict, on drug use is primarily indirect via its causal relationship with youth characteristics, such as low self-control (Wills & Yaeger, 2003). More plausible is the case that children develop low self-control in part through repeated negative interactions with their parents and in part through genetic predispositions, and it is the inability of parents to manage impulsive child behavior which perpetuates parent-child conflict and ultimately leads to youth drug use (Wills & Dishion, 2004). Further, research on neurobehavioral disinhibition (ND)—a term used to describe psychological and behavioral disturbances indicative of poor self-control believed to originate in the prefrontal cortex—confirms a link between self-regulation processes and the development of problem substance use (Kircisci, Kircisci, Vanyukov, & Tarter, 2005).

Longitudinal (Brook, Brook, Zhang, & Cohen, 2009; Skeer et al., 2011) and cross-sectional (Wills, Walker, Mendoza, & Ainette, 2006) investigations find support for the transactional model. For example, Wills and colleagues (2006) found in a sample of adolescents that parental conflict was related to both poor behavioral and emotional self-control, which then

influenced adolescent substance use. Behavioral indicators of low self-control in youth similarly mediate the link between the family environment and youth drug use. The Project on Human Development in Chicago Neighborhoods (Skeer, McCormick, Normand, Buka, & Gilman, 2009), for instance, demonstrated an association between family conflict in adolescence and substance abuse disorders in early adulthood which was mediated by degree of adolescent externalizing behavior, such as aggression and delinquency. Interestingly, when gender was considered in a follow-up study, family conflict was related to an increased risk of substance use disorders in females only—and upon further inspection, revealed this relation to be facilitated by conduct problems (Skeer et al., 2011). This association may in part explain earlier research that suggests family dysfunction (Dakof, 2000) and general environmental factors (Hicks, South, Dirago, Iacono, & McGue, 2009), including possibly parent-child conflict, are more influential to problem drug use in females than in males. Thus, a transactional model linking parent-child conflict and self-control is useful for explaining risk for drug use in young women.

Mindfulness and drug use

Similar to self-control interventions (e.g., Muraven, 2010), mindfulness training is a psychotherapeutic approach to curb substance use. Mindfulness-Based Relapse Prevention (MBRP; Witkiewitz et al., 2013) has been developed for individuals with substance use disorders and, in a randomized controlled trial of individuals with drug and alcohol use disorders, was associated with reduced substance use, reduced drug cravings, increased acceptance, and acting with awareness at four month follow-up (Bowen et al., 2009). Other multi-component therapeutic interventions, which include mindfulness training, such as Dialectical Behavioral Therapy (DBT; Linehan, 1993) or Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2012) have also demonstrated reductions in substance use in randomized controlled trials (Linehan et al., 1999; Hayes et al., 2004).

Therefore, mindfulness, conceptualized as the ability to attend to the present moment without judgment (Brown & Ryan, 2003), is considered to be a potentially modifiable protective factor for substance abuse. It is often reported that mindfulness buffers the association between known risk factors and several forms of negative mental health outcomes (Feltman, Feltman, Robinson, & Ode, 2009; Lamis & Dvorak, 2013; Masuda, Price, & Latzman, 2012; Saavedra, Chapman, & Rogge, 2010). Mindfulness training likely works by increasing the awareness of self and the present moment, improving attentional control and self-regulation, and specific to substance abuse, by introducing new ways of reacting to uncomfortable situations and cues to use (Witkiewitz et al., 2013).

Compared to self-control, the etiology of mindfulness and drug use and the role of familial-level factors in the development of problematic drug abuse are less studied. The extant literature takes a developmental perspective to explain the emergence of mindfulness. Mindful awareness is thought to emerge in the context of healthy parent-child relationships (Ryan, Brown, & Creswell, 2007; Shaver, Lavy, Saron, & Mikulincer, 2007). There is even evidence that mindfulness is negatively related to adult attachment anxiety and an avoidant attachment style (Shaver et al., 2007), which are long-term indicators of interpersonal problems in childhood. As Shaver et al. (2007) indicated, “the process by which interaction

with loving and coherent attachment figures gradually strengthens and sustains authentic self-esteem, the capacity for stable mindfulness, and effective emotion regulation (p. 267).” Even though no studies have examined the connection between parent-child conflict and mindfulness, we posit a negative association exists. Given the relation between mindfulness and substance abuse outcomes, it is also evident that mindfulness may play a role in the transactional process linking parent-child conflict to drug use. Conceptual similarities between the two constructs (e.g., attentional control) further this claim.

Current study

To our knowledge, mindfulness has not been specifically evaluated in the context of parent-child conflict, self-control, and problem drug use. It is possible that parent-child conflict leads to deficits in self-control, as well as to deficits in dispositional mindfulness, which then leads to increased problems related to substance use. There could also be an interaction between mindfulness and self-control; increased mindfulness may attenuate the negative impact of deficits in self-control (e.g., poor planning abilities, greater impulsive behavior) or vice versa on the development of later negative substance abuse outcomes. This would be consistent with findings from mindfulness-based substance abuse treatment; that is, despite low self-control, users are able to maintain sobriety through increases in dispositional mindfulness. An interaction between mindfulness and self-control with such an implication is also consistent with findings from a study examining their interactive effect on psychological distress in college students (i.e., one buffers the negative effects of low amounts of the other; Bowlin & Baer, 2012). Such an investigation would link two lines of drug research: the developmental literature on the etiology of drug use and the substance abuse treatment literature focusing on mindfulness and self-control as targets for intervention.

The aim of the current study is to evaluate the association between parental-child conflict and drug use severity, via self-control and mindfulness, in a sample of female undergraduates. We limited the sample to female college students in line with the research on gender differences in the development of problem drug use, and due to the lack of research in this area with young women. Specifically, we hypothesized that self-control and mindfulness would mediate the relationship between parent-child conflict and drug-related problems. In addition, we hypothesized an interaction between self-control and mindfulness would moderate this indirect pathway highlighting potential mechanisms of intervention (i.e., moderated mediation). The theoretical model is depicted in Figure 1. Such results would underline *how* mindfulness-based or self-control-based prevention or treatment strategies may improve drug use outcomes, specifically by impacting the relationship between parent-child conflict and drug-related problems. Finally, our analyses will explore differences in how these associations account for the emergence of problem drug use versus how they account for the intensity or severity of drug-related problems; this analysis will permit us to differentiate recommendations for prevention as compared to treatment.

Methods

Participants

Participants consisted of 928 undergraduate women, ages 18 to 26 years (M age = 19.92, SD = 1.58) enrolled in psychology classes from a university in the southeastern U.S. The majority of women described their race/ethnicity as Caucasian (n = 712, 76.7%), followed by African American (n = 113, 12.2%), Hispanic/Latino (n = 29, 3.1%), Asian American (n = 21, 2.3%), Native American (n = 4, 0.4%) and an additional 5.3% (n = 49) of the sample indicated “other” for race/ethnicity. The sample consisted of approximately equal numbers of freshmen (n = 300, 32.3%), sophomores (n = 210, 22.6%), juniors (n = 199, 21.4%) and seniors (n = 219, 23.6%). Five hundred (500; 53.9%) of the women reported they were not in a relationship and 9.8% (n = 91) of them reported living with a parent. Of the women who participated in the study, 27.8% (n = 258) indicated that they were a member of a sorority. Transfer students made up 24.4% (n = 226) of the sample.

Measures

Covariates—Age, race (i.e., White; no/yes), class in school, transfer student status (i.e., transfer student; no/yes), sorority affiliation (no/yes), relationship status (not in a relationship vs. in a relationship), and residency status (not living with parent vs. living with a parent) were included as covariates in all analyses to control for individual differences. Race, age, and relationship status have all been associated with drug use (Compton & Compton, 2013), as has sorority membership (McCabe, Teter, & Boyd, 2006). Class year in school and residency status were both included because of their potential associations related to independence from parents and parental exposure that would influence parent-child conflict. Analyses also adjusted for transfer status because transfer students may be less connected socially than other students which could impact exposure to drug use.

Independent Variable

The Parental Environment Questionnaire—(PEQ; Elkins, McGue, & Iacono, 1997) was administered to assess perceptions of the relationship between the student and his/her parent. Respondents were asked to rate statements describing their interactions with their parents on a 4-point Likert Scale (1 = *definitely false*, 2 = *probably false*, 3 = *probably true*, 4 = *definitely true*). The PEQ consists of five subscales based on a factor analysis: conflict with parent, involvement with parent (warm, supportive communication), child’s regard for parent, parent’s regard for child, and structure (parental control). Scores on the PEQ have been found to be significantly correlated with scale scores on the well-established Family Environment Scale, lending support for its validity (Elkins et al., 1997). The PEQ was developed using in part a late adolescent sample. The current study focused on the 12-item child version of the perceived parent-child conflict scale (e.g., “My parent often criticizes me”; My parent and I often get into arguments”). Items were scored such that high scores corresponded to high levels of perceived parent-child conflict. The parent-child conflict scale has displayed good internal consistency reliability in previous studies (Klahr, McGue, Iacono, & Burt, 2011). Cronbach’s alpha was 0.93.

Potential Mediators

Self-Control and Self-Management Scale—(SCMS; Mezo, 2009) is a 16-item measure on which respondents indicate how descriptive each statement is of them. The SCMS is scored on a six-point Likert scale (0 = *very unresponsive of me*, 1 = *mostly unresponsive of me*, 2 = *a little unresponsive of me*, 3 = *a little responsive of me*, 4 = *mostly responsive of me*, 5 = *very responsive of me*). Items assess the global construct of self-control and self-management through three subscale components: self-monitoring (six items; e.g., ‘When I am working toward something, it gets all of my attention’), self-evaluating (five items; e.g., ‘The goals I achieve do not mean much to me’), and self-reinforcing (five items; e.g., ‘I congratulate myself when I make some progress’). Total scores can range from 0 to 80. Following reverse scoring of the self-evaluating items, higher scores indicate higher degrees of self-control skills. The SCMS has shown good estimates of internal consistency, convergent validity, and discriminant validity in studies with university students (Mezo & Short, 2012). The three individual subscales were used to form the factor indicators. Cronbach alphas for the subscales ranged from .84–.87 in the current sample.

The Mindful Attention Awareness Scale—(MAAS; Brown & Ryan, 2003) is a 15-item, self-report measure, that measures dispositional mindfulness (e.g., “I rush through activities without being really attentive to them” and “I drive places on ‘automatic pilot’ and then wonder why I went there”). Dispositional mindfulness is defined as an open or receptive awareness of and attention to what is taking place in the present (e.g., “It seems I am running automatic without much awareness of what I’m doing”). Participants rate the degree to which they function mindlessly in daily life, using a six-point Likert scale ranging from 1 (almost always) to 6 (almost never), with higher scores denoting greater mindfulness. The MAAS has good internal consistency (i.e., Cronbach’s α), ranging from 0.82 to 0.87 (Brown & Ryan, 2003), and a confirmatory factor analysis conducted with college women supported a unidimensional factor structure (MacKillop, MacKillop, & Anderson, 2007). In the current study, the Cronbach’s alpha of this measure was 0.91.

Dependent Variables

The Drug Use Disorders Identification Test—(DUDIT; Berman, Bergman, Palmstierna, & Schlyter, 2005) is an 11-item self-report questionnaire that assesses the level of drug intake and fulfillment of selected criteria for substance abuse/harmful use and dependence according to the DSM-IV diagnostic systems which was designed to be used as an interval scale with clinical and non-clinical populations. The DUDIT was developed as an analogous instrument to the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993), to provide detailed information about respondents’ substance use, excluding alcohol, including the patients’ perceptions of use and problems related to use. Items include: “How often do you use drugs other than alcohol,” “How many times do you take drugs on a typical day when you use drugs,” and “How often over the past year have you taken drugs and then neglected to do something you should have done?” Items 1 through 4 are related to patterns of use with no mention of a timeframe so it is likely respondents answered with respect to current usage. Items 5 through 9 refer to past year problems related to use and items 9 and 10 ask about past year versus lifetime problems with use. The first nine questions are scored on 5-point scales ranging

from 0 to 4, and the last two are scored on 3-point scales with values of 0, 2, and 4. Thus, total scores range from 0 to 44, with higher scores suggestive of more problematic or severe use. A previous study has demonstrated the DUDIT to have strong validity and reliability as a unidimensional construct (Voluse et al., 2012). In the current sample, the internal consistency reliability estimate was 0.88.

Procedure

Data collection was conducted through an online survey over the course of three semesters, with approximately equal numbers of participants completing the study during each of the semesters. College women voluntarily completed the survey outside of class time in return for extra credit in their psychology course. Participants were informed of the study in regularly scheduled classes and through a posting on the online participant pool site. Participants completed a demographic survey and the study measures, which were presented in a randomized order. Prior to data collection, electronic informed consent was obtained from all women participants. It explained that survey items were personal in nature, participation was anonymous, and skipping survey items was possible. Surprisingly, there was no missing data. The online, anonymous responding likely minimized the likelihood of participants skipping sensitive items. The university's Institutional Review Board approved the study in advance of data collection, and ethical procedures were followed throughout the study.

Analysis Overview

We initially estimated a measurement model of the latent variable constructs. We then specified the hypothesized model (depicted in Figure 1) in Mplus 7.11 using maximum likelihood estimation with robust standard errors (Muthén & Muthén, 2012). The model had drug-related problems as the criterion. Parent child conflict was the exogenous variable and mindfulness and self-control were mediator variables. A latent variable interaction between mindfulness and self-control was also examined. The latent interaction required numerical integration, and thus traditional fit indices are not provided. The simple slopes of drug-related problem severity on mindfulness were probed at high (i.e., $+1SD$) and low (i.e., $-1SD$) levels of self-control (Aiken & West, 1991). Table 2 presents parameter estimates in linear form to maintain consistency throughout the model, however, the simple slopes depicted in Figure 2 are presented as incident rate ratios (IRR) which are more consistent with the non-linear outcome. Covariates were included as predictors on the following variables: parent-child conflict, mindfulness, self-control, and drug-use problems.

Results

Descriptive Statistics

Descriptive and bivariate statistics are listed in Table 1. Drug-related problems was inversely correlated with being in a relationship, self-control, and mindfulness, and positively correlated with parent-child conflict. Not tabled is a description of specific drug use among participants reporting any degree problem drug use investigated in the intensity portion of the hurdle model below ($n = 336$). Any use of the following drugs was reported: marijuana (84.2%), amphetamines (29.8%), cocaine (20.2%), heroin (2.7%), hallucinogens

(19.2%), pain-relievers (e.g., oxycontin; 24.1%), sleeping pills or sedatives (12.7%), and benzodiazepines (23.2%).

Measurement Model

We first estimated a measurement model of the latent variable constructs. Items were randomly selected to form three parcels each for the self-control and mindfulness variables, and five parcels for the parent-child conflict scale. The latent measurement model indicated adequate fit to the data, $\chi^2(41) = 103.11, p < .001$, CFI = 0.99, RMSEA = 0.040 (90% CI 0.031–0.050), SRMR = 0.021; however, examination of modification indices suggested significant correlated errors between five pairs of observed variables in the PCCS. These errors were freed, and the model was re-estimated. The revised measurement model, with five correlated errors, offered exceptional fit to the data, $\chi^2(36) = 46.93, p = .104$, CFI = 1.00, RMSEA = 0.018 (90% CI 0.000–0.031), SRMR = 0.016. The final model was a significantly better fit to the data, $\chi^2(5) = 56.18, p < .001$.

Analytic Model Selection

Given that the outcome had significant positive skew as well as an excess of zeros, three separate models were compared. Clark's distribution free tests (Clarke, 2007) comparing a negative binomial hurdle model to both a zero-inflated negative binomial model ($p = .002$) and a negative binomial model without inflated zeros ($p < .001$) indicated that the hurdle model offered a better fit to the data. A test of alpha showed significant overdispersion indicating a negative binomial distribution of the count function was more appropriate than a Poisson distribution, $G^2 = 8.70, p < .001$. Thus, we examined the likelihood of experiencing any drug-related problems (vs. not) as well as the intensity or severity of drug-related problems among individuals with a history of drug-related problems.

Drug-related Problems Hurdle Model

Logistic portion of model—The conditional logistic portion of the model tested the likelihood of experiencing a drug-related problem ($n = 928$). The model is depicted in Figure 1. Coefficients from the logistic portion of the model are listed above the line. Full parameter estimates are depicted in Table 2. Parent child conflict was inversely related to mindfulness and self-control. Consistent with hypothesis, self-control was inversely associated with the likelihood of endorsing any drug-related problems (vs. not). Further, there was a significant indirect effect from parent child conflict to drug-related problems via self-control, indicating that parent child conflict reduced self-control which in turn increased the likelihood of experiencing any drug-related problems.

Zero-truncated negative binomial portion of model—The count portion of the model consisted of a zero-truncated, negative-binomial distributed, outcome of drug-related problem intensity. Results of the count portion of the model were directionally consistent with, though generally less robust than, the logistic portion of the model (see Table 2). In addition, the latent variable interaction between mindfulness and self-control was a significant predictor of drug-related problem intensity. This interaction was probed at high (i.e., $+1SD$) and low (i.e., $-1SD$) levels of self-control, see Figure 2. At high levels of self-control, mindfulness was not associated with drug-related problem intensity; however, at

low levels of self-control, mindfulness exhibited a significant protective association with drug-related problem severity. The indirect effect from parent child conflict to drug-related problems through mindfulness was only significant at low levels of self-control.

Discussion

Our study was conducted to examine potential mediators and moderators of the association between parent-child conflict and illicit drug use in college women. Findings suggest that self-control, but not mindfulness, mediates the positive association among parent-child conflict and the likelihood of experiencing any problems related to drug use. When drug-related problem intensity was considered, mediation occurred through an interaction between self-control and mindfulness. Parent-child conflict had a positive association with drug-related problems through mindfulness only in individuals with low self-control. This relation can best be understood as a compensatory effect wherein a higher degree of either self-control or mindfulness protects against a lower degree of the other. These results expand existing research on the etiology of problem drug use and inform future development of interventions to prevent and treat drug use among non-clinical female populations.

Self-control and the etiology of problem drug use

Our results are consistent with prior longitudinal and cross-sectional research which identifies developmental pathways involving family conflict and declines in self-regulation that underlie the emergence of drug problems in young people (Brook et al., 2009; Skeer et al., 2011; Wills et al., 2006). Specifically, parent-child conflict experienced in adolescence has been associated with low self-control (e.g., impulsivity) in the mid-twenties, which in turn, is linked to a heightened risk for a substance use disorder in the late-thirties (Brook et al., 2009).

Our findings also are consistent with linkages between neurobehavioral disinhibition and substance abuse (Kirisci, Tarter, Mezzich, & Vanyukov, 2007). Although neurobehavioral disinhibition in early adolescence may operate independently of some family factors (i.e., parental neglect) in its prospective association to problem drug use in late adolescence (Tarter, Kirisci, Habeych, Reynolds, & Vanyukov, 2004), it is possible that negative family environments facilitate the expression of individual predispositions related to poor self-control through a diathesis-stress mechanism, a finding supported by tests of gene by environment interactions (Feinberg, Button, Neiderhiser, Reiss, & Hetherington, 2007; Hicks, South, Dirago, Iacono, & McGue, 2009). Further evidence is needed to disentangle the effects of family environment, genetic predisposition, and self-control on the development of drug use. Moreover, environmental influences (e.g., parent-child conflict) to problem drug use may be of greater importance and thus require more attention for young adult women than men (Hicks et al., 2009).

It is important to note that other determinants of drug-related problems should be explored alongside our results (e.g., childhood maltreatment; Chauhan & Widom, 2012). Of particular importance are psychosocial factors reflecting peers and peer relationships during college and the transition to adulthood, perhaps more so than some parenting factors. Relevant to the present study, peer affiliation is found to share a strong association to individual patterns of

young adult drug use. For example, among college students using marijuana for the first time, low parental monitoring in high school, and a high percentage of marijuana using peers were important predictors of exposure to marijuana and first time use, respectively, in college (Pinchevsky et al., 2012). Furthermore, a question remains regarding social selection versus social influence and the role of self-control in the emergence of problem drug use. Given that the association with certain peer groups may be partially explained by individual predispositions (Tarantino et al., 2013), perhaps by a social selection process, a path might be observed from increased parent-child conflict to deficits in self-control, then to stronger affiliations with drug using peers, and finally to heightened individual drug use (Brook et al., 2009).

Claims of etiology require causal assumptions and because our results are cross-sectional, it is possible that associations observed could be interpreted differently. Indeed, alternative models would likely be empirically equivalent. For example, low self-control underlying problem behavior, including drug use, could be conceived as an antecedent to parent-child conflict; conflicts with young people may begin after rather than before they have acted out and used drugs. It is also possible that parenting and child temperament and behavior have a reciprocal relationship, including between parent-child conflict and adolescent externalizing symptomology (Burt, McGue, Krueger, & Iacono, 2005), which is mediated by low self-control, and which leads to the emergence of young adult drug-related problems (Mezzich et al., 2007). Temporal ordering needs to be established through longitudinal research, in particular, studies of parent-child conflict that extend into young adulthood.

The role of mindfulness

Studies of mindfulness are noticeably absent from the family literature with the exception of a small number of mindfulness-based parenting interventions (Duncan, Duncan, Coatsworth, & Greenberg, 2009), and how a mindful disposition is developed has garnered considerable attention (see a recent call for papers in *Developmental Psychology*). Ours is the first study to show a significant link between parent-child conflict and mindfulness in young adults, which is consistent with developmental theory and research on the emergence of mindfulness abilities (Ryan et al., 2007; Shaver et al., 2007). Reports of parent-child conflict among late adolescent and early adult women, though measured presumably as current conflict, likely are indicative of a longer-term pattern of family functioning. Repeated negative interpersonal interactions and consequent critical attitudes youth hold towards their parents could lay the groundwork for internal working dispositions characterized by a lack of attentional control, a judgmental self-awareness, and an inability to stay in the present.

Unlike self-control, mindfulness was not implicated in the association between parent-child conflict and likelihood of experiencing any drug-related problems, even though there was a direct effect of parent-child conflict on mindfulness. Instead, we found a significant interactive effect between self-control and mindfulness on drug-related problem intensity. This cross-sectional association is similar to a study by Bowlin and Baer (2012) who found an interaction between self-control and mindfulness on number of psychological symptoms (depression and anxiety combined) in a sample of college students such that when self-control was low, psychological symptoms remained low only when mindfulness was high.

The finding also adds to a growing literature which suggests mindfulness and related factors (i.e., low experiential avoidance) protect against a range of psychological vulnerabilities.

Taken together, these findings are evidence for the importance of dismantling successful mindfulness-based interventions for substance abuse, and investigations on whether and how mindfulness interacts with self-control. The decrease in drug cravings reported by patients in such treatment may be due in part to the development of mindfulness-based skills, which compensate for a lack of self-control over drug-related cognitions and urges. Indeed, there has been a call for additional studies disentangling the effects of self-control and mindfulness, as well as exploring casual associations between them (Masicampo & Baumeister, 2007).

Implications for counseling practice

Though we did not test the effects of a mindfulness-based or self-control-based intervention, our findings suggest these are important variables to be considered for preventing and treating drug use in college women. Specifically, among users and non-users, self-control but not mindfulness was associated with any problem use. This implicates self-control as a possible target for the primary prevention of drug-related problems and use. Dispositional mindfulness became important when examining drug-related problem intensity. For women already experiencing some degree of problem use, particularly those at-risk through low self-control, mindfulness may limit the severity of problems associated with use. Therefore, perhaps mindfulness should be targeted for treatment or relapse prevention purposes. In addition to substance abuse, mindfulness has been used to treat a variety of other externalizing behaviors related to self-regulation (Baer, Baer, Fischer, & Huss, 2005; Toneatto, Vettese, & Nguyen, 2007; Fleischhaker, Böhme, Sixt, Brück, Schneider, & Schulz, 2011). Due to its widespread utility, mindfulness based strategies seem promising to counselors who often see clients with a diversity of psychosocial needs. Application of mindfulness through counseling varies as it can be used alone or as part of a multicomponent therapy (Hayes et al., 2004). Even in time-limited settings, such as brief 15-minute interventions with female college students who are novice practitioners (Feldman, Greeson, & Seniville, 2010), a mindfulness approach seems to be beneficial. Moreover, mindfulness as a skill can be taught early in life. Mindfulness-based interventions for school-aged children improve mental health outcomes (e.g., Mendelson et al., 2010). Targeting self-control also proves an effective target for drug use. Though implicitly targeted in more comprehensive programs involving cognitive-behavioral therapy (Barrett et al., 2001), brief self-control interventions also show promise. Muraven (2010), for example, found that smokers who practiced small acts designed to raise self-control during the two weeks prior to quitting smoking had longer periods of abstinence than smokers who did not. Finally, degree of mindfulness and self-control in young adults experiencing family difficulties that present to counseling settings should be considered, as these may be indicators of problem drug use. Moreover, family-based interventions early in life aimed at decreasing family conflict could have long-term preventive effects on the development substance abuse (Kumpfer & Alvarado, 2003).

Limitations

In addition to being cross-sectional, as acknowledged previously, a few other limitations are noted. First, our study consisted of female college students from a large public university who identified primarily as White. Although a portion of our analyses was limited to students endorsing some degree of problem drug use, our sample was not drawn from a clinical population. Cross-validation of the current study with more racially diverse, less educated, non-college, male, and clinical samples should occur in the future to confirm our findings and increase generalizability. Third, all measures used were self-report, which could create bias in responding as participants may minimize symptoms or conflict to create more positive impressions of themselves. It is possible that the relations were due to shared method variance rather than real relationships among variables. The online format and anonymous responding likely helped limit demand characteristics. Future studies should use multiple informants when collecting and analyzing similar data, most importantly for interpersonal, dynamic measures such as parent-child conflict. Finally, two limitations related to our measure of drug-related problems should be noted. Though using a brief measure is relevant to counseling settings (i.e., quick identification of risk), its use here precluded identifying unique associations to specific drug use or associations to polysubstance use. Research has shown that although familial variables contributing to drug use among women are not drug-specific, some factors matter more than others depending on the drug (Karkowski, Prescott, & Kendler, 2000). Different results may have been obtained if the associations examined were drug-specific. In addition, to our knowledge, this measure has not been validated with non-clinical samples, although it was designed to be used with general populations (Berman et al., 2005), and thus its validity with our sample is questioned. Given its applicability to counseling settings and screenings, we expect our findings to contribute to a growing literature on this relatively new measure.

Conclusions

In conclusion, our study extends current research by demonstrating a moderated mediation model of the association between parent-child conflict and problem drug use. Parent-child conflict serves as risk factor for problem drug use through its association with low self-control, and mindfulness may be buffer this association when intensity of problem drug use is considered. Counselors are encouraged to consider the importance of family environment, even as adolescents enter early adulthood, when assessing drug use risk. Finally, mindfulness as a tool against drug use needs to be further studied, as it may have potential to limit the negative effects of low self-control brought on by parent-child conflict.

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Figure 1.
Theoretical Model.

Figure 2. Hurdle model of drug use problem severity. Covariates were regressed onto PCCS, Mindfulness, Self-control, and Drug Use & Problems. Coefficients above the line are from the logistic portion of the model, coefficients below the line are from the count portion of the model. $*p < .05$, $**p < .01$, $***p < .001$. The interaction between self-control and mindfulness on drug-related problem intensity.

Table 1

Descriptives and Bivariate Correlations Between Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	Range	Mean	SD
1. Race												0–1	.76	.43
2. Age	-.10											18–26	19.99	1.65
3. Class year	-.09	.78										0–3	1.35	1.15
4. Relationship status	.03	.10	.07									0–1	0.45	0.50
5. Sorority membership	.15	-.05	.02	-.08								0–1	0.28	0.45
6. Transfer student	-.09	.41	.28	.07	-.08							0–1	0.24	0.43
7. Resides with parent	-.15	.07	.03	.00	-.14	.18						0–1	0.10	0.30
8. Self-control	-.05	.09	.17	.04	.05	-.00	.03					n/a	0.00	1.00
9. Mindfulness	-.02	.07	.11	-.01	.04	.04	-.02	.33				n/a	0.00	1.00
10. Parent-child conflict	.02	-.10	-.10	.00	-.07	.04	.07	-.25	-.21			n/a	0.00	1.00
11. DUDIT Score	.04	-.03	-.02	-.06	-.03	-.03	.04	-.16	-.14	.17		0–37	2.62	5.25

Note: significant correlations ($p < .05$) are bolded. Race (0 = non-White; 1 = White), relationship status (0 = not in a relationship; 1 = in a relationship), sorority membership (0 = not in a sorority; 1 = in a sorority), transfer student (0 = not a transfer student; 1 = transfer student), resides with parent (0 = does not reside with parent; 1 = resides with parent) were all dummy coded. Correlations with drug-related problems are only among individuals who endorsed drug use ($n = 282$).

Table 2

Hurdle model path coefficients

Model Paths	Drug Problem Hurdle Model			
	<i>(n = 928)</i> Likelihood		<i>(n = 336)</i> Intensity	
	B (SE)	<i>p</i>	B (SE)	<i>p</i>
Main Effects				
PCCS→Mindfulness	−0.344 (0.036)	<.001	−0.301 (0.051)	<.001
PCCS→Self-control	−0.154 (0.034)	<.001	−0.166 (0.044)	<.001
PCCS→SU outcome	0.216 (0.106)	.041	0.105 (0.077)	.169
Mindfulness→SU	−0.047 (0.158)	.768	−0.289 (0.309)	.350
Self-control→SU	−0.761 (0.369)	.039	−0.148 (0.475)	.755
Self-control × Mindfulness→SU	0.400 (0.264)	.129	0.464 (0.223)	.047
PCCS→Mindfulness→SU	0.016 (0.055)	.767	0.087 (0.094)	.354
PCCS→Self-control→SU	0.117 (0.055)	.033	0.025 (0.079)	.756
Moderation Effects				
+1SD Self-control				
Mindfulness→SU			0.175 (0.416)	.675
PCCS→Mindfulness→SU			−0.029 (0.069)	.673
−1SD Self-control				
Mindfulness→SU			−0.754 (0.356)	.034
PCCS→ Mindfulness→ SU			0.130 (0.065)	.046

Note. PCCS = Parent-Child Conflict Scale. SU = Substance Use outcome for each model. All coefficients are unstandardized.