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The Impact of Mother and Adolescent Offspring Distress Reduction Training on Maternal Anxiety and Alcohol Related Behaviors Following Conflict

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The Impact of Mother and Adolescent Offspring Distress Reduction Training on Maternal
Anxiety and Alcohol Related Behaviors Following Conflict

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy in Psychology

by

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Abstract

Nearly half of people suffering from psychopathology meet criteria for more than one disorder. Scholars have focused on understanding factors that may simultaneously maintain multiple psychiatric problems. Elevated distress during interpersonal conflict is likely to maintain both alcohol use and anxiety psychopathology. Reducing distress elicited by normative mother-adolescent conflict holds particular promise. Conflict is common in families with problematic drinking and anxiety disorders and the affective impact of parent-offspring conflict is malleable. Distress reduction skills, such as cognitive reappraisal, are effective in reducing distress during conflict. The current study examined the unique and combined effects of training mothers and adolescents in distress reduction techniques in terms of conflict-elicited maternal distress as well as multimodal assessment of subsequent maternal anxiety and alcohol use cravings. Fifty-nine mothers who endorsed alcohol use and elevated levels of anxious arousal and their adolescent offspring completed a baseline assessment, including a well-established, standardized, laboratory-based mother-offspring conflict task. Mother-adolescent dyads were randomly assigned to one of four groups, wherein both, one, or neither member of the dyad undergoes distress reduction training. Psychoeducation (focused on adolescent development) was used as a control condition. Contrary to hypotheses, distress reduction training was not related to changes in multimodal assessments of maternal anxiety and alcohol use cravings. Possible explanations for these findings as well as limitations and future directions are discussed.

Keywords: anxiety, mother, cognitive reappraisal, conflict, adolescent, alcohol

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Introduction

Nearly half of people suffering from psychopathology meet criteria for more than one

disorder (e.g., Cramer, Waldorp, van der Maas, & Borsboom, 2010; Lilienfeld, Waldman, &

Israel, 1994; Vaidyanathan, Patrick, & Iacono, 2011), which has led scholars to focus on

identifying factors that may simultaneously maintain multiple psychiatric problems [i.e.,

transdiagnostic maintenance factors; (e.g., Aldoa, 2012; Boswell, Farchione, Sauer-Zavala,

Murray, Fortune, & Barlow, 2013; Cheetham, Allen, Yucel, & Lubman, 2010; Nolen-

Hoesksema & Watkins, 2011; Tackett et al., 2013)]. Disorders characterized by anxious arousal

[e.g., posttraumatic stress disorder (PTSD), social anxiety disorder (SAD), panic disorder (PD)]

are commonly comorbid with hazardous alcohol use (Grant et al., 2004; Kessler et al., 1997;

Kushner, Abrams, & Borchardt, 2000). The efficacy of treatments for comorbid disorders

characterized by anxious arousal and alcohol use is limited. It has been posited that psychiatric

comorbidity may be due, in part, to factors that potentiate the maintenance of multiple disorders

(Teesson & Proudfoot, 2003). This suggests that identifying malleable, transdiagnostic factors

for psychopathology represents a critical step for advancing our understanding and treatment of

comorbidity.

Definitions Related to Anxious Arousal and Hazardous Alcohol Use.

Anxious arousal (characterized primarily by physiological hyperarousal) is a central

characteristic of anxiety and trauma-related disorders (Brown, Campbell, Lehman, Grisham, &

Mancill, 2001; Mineka, Watson, & Clark, 1998; Watson, 2005; Watson & Clark, 1991; Watson

et al., 1995). Anxious arousal is conceptualized as a cluster of symptoms related to somatic

tension and hyperarousal (e.g., shortness of breath, dizziness, racing heart, nausea; Watson, 2005) that is thought to be a transdiagnostic component of anxiety and trauma-related disorders (e.g., Lang & McTeague, 2009; Mineka, Watson, & Clark, 1998; Watson, 2005; Watson & Tellegan, 1985). Indeed, evidence suggests disorders characterized by anxious arousal (e.g., PTSD, PD, SAD) share features that result in social and occupational impairment (e.g., Brown, Campbell, Lehman, Grisham, & Mancill, 2001; Mineka et al., 1998).

Current diagnostic approaches to alcohol use disorders (AUDs) suggest disorder severity varying from mild to severe (American Psychiatric Association, 2013). "Hazardous drinking," describes a use pattern that increases risk of harm for the user and/or others (Babor et al., 1994). The current proposal focuses on the broader alcohol use construct because of its documented public health significance, even in the absence of AUDs (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). One of the hallmark features of hazardous alcohol use is alcohol craving. Alcohol craving is conceptualized as a desire to drink alcohol (Kavanagh & Conner, 2013) and is considered a temporary state associated with a distinct set of physiological, behavioral, and verbal responses (Tiffany & Conklin, 2000).

Comorbid Alcohol Use and Anxiety is Common and Problematic

Individuals with anxiety disorders are two to four times more likely to report problems with alcohol use than individuals without these problems (Kessler et al., 1997; Regier et al., 1990). Further, quality of life for people with this constellation of problems is significantly worse than those with alcohol use problems alone (Kalman et al., 2004), including lower educational attainment and income, poorer occupational functioning, poorer physical health, higher unemployment, and higher levels of alcohol craving (Drapkin et al., 2011; Najavits, Weiss, & Shaw, 1997; Ouimette, Finney, & Moos, 1999; Smith & Randall, 2012). Additionally, substance

use problems can reduce the likelihood of recovery from anxiety disorders (Bruce et al., 2005; Hornig & McNally 1995; Schadé et al., 2004), while alcohol use can increase anxiety (Kushner, Abrams, & Borchardt, 2000). For example, inpatients receiving treatment for substance use disorders who were also diagnosed with disorders characterized by anxious arousal endorsed longer histories of problematic substance use, relatively elevated suicidal behavior (Bonin, Norton, Asmundson, Dicurzio, & Pidlubney, 2000), and were more likely to meet criteria for an additional mood or anxiety disorder (Read, Brown, & Kahler, 2004). Given the common co-occurrence and severe impairment associated with concurrent elevations in anxious arousal and alcohol use, there has been substantial scholarship focused on treatment for this type of comorbidity.

Comorbid alcohol use and disorders characterized by anxious arousal are related to worse treatment outcomes than the presence of only one diagnosis (Brown & Wolfe, 1994; Najavits, Weiss, & Shaw, 1999; Ouimette, Brown, & Najavits, 1998, Ouimette et al., 1999; Smith & Randall, 2012). For example, anxiety impedes treatment of alcohol use problems (Driessen et al., 2001; Falk, Yi, & Hilton, 2008; Kushner et al., 2005; Brown et al., 1999). Recognizing the difficulty in treating comorbid disorders characterized by anxious arousal and comorbid alcohol use problems, scholars have attempted to develop specific treatments for this constellation of problems (Abueg & Fairbank, 1992; Kushner et al., 2005, 2006; Najavits, Weiss, & Liese, 1996; Najavits, 2004; Triffleman, 2000). Unfortunately, these targeted treatments often do not outperform active comparison conditions through follow-up assessments (Abueg & Fairbank, 1992; Hien et al., 2009; Kushner et al., 2006; Roberts, Roberts, Jones, & Bisson, 2015; Triffleman, 2000; Zlotnick, Johnson, & Najavits, 2009). Accordingly, scholars have suggested that other aspects of the clinical presentation need to be considered as treatment targets,

including factors related to social functioning (e.g., Cohen & Hein, 2006). In order to improve treatments for comorbid disorders characterized by anxious arousal and alcohol use, we need to better understand the transdiagnostic maintenance factors that make this population more severe and more difficult to treat (Smith & Randall, 2012). Although the current study is recruiting parents who report alcohol use, rather than parents who meet criteria for an AUD, this population may yield important information about processes at play in problematic comorbidity between disorders characterized by anxious arousal and alcohol use disorders.

Maternal Symptomatology is Likely Maintained, in part, by Conflict-Elicited Distress

Adolescence can be broadly defined as "that awkward period between sexual maturation and the attainment of adult roles and responsibilities " (Dahl, 2004, p. 9). It is a developmental period characterized by a change in social roles interspersed by changes in biology and development. Theories of individual change hold that changes in adolescents provokes/evokes changes in the family (Laursen & Colllins, 2009). Indeed, adolescence is characterized by a modest renegotiation of the parent child relationship, in which increasingly autonomous functioning is a critical developmental milestone (Wray-Lake, Croute, & McHale, 2010). As a part of this increasing autonomy, adolescents are able to exert more influence in their social interactions, and the parent-child interactions become more dynamic. As offspring age, they become more independent, autonomous, agents. Significantly, advances in cognitive development allow adolescents to have a more egalitarian view of the parent adolescent relationship, where previously parents had the power and authority (Smetana, 1988).

Notably, parent-adolescent conflict is common and considered a normative part of adolescent development (e.g., Laursen, Coy, & Collins, 1998; Steinberg, 2001). Nonetheless, evidence suggests conflict is more frequent and intense in families with hazardous drinking

(Barrera, Li, & Chassin, 1995; Hussong & Chassin, 2002; Keller, Cummings, Davies, & Mitchell, 2008) and anxiety disorders (Drake & Kearny, 2008; Hinton, Rasmussen, Nou, Pollack, & Good, 2002; Jordan et al., 1992). Moreover, conflict likely maintains alcohol use (Marlatt & Gordon, 1980) and anxiety symptoms (Nayback-Beebe & Yoder, 2011). Indeed, stressful interactions with offspring are related to increased parental alcohol use (Mayes & Truman, 2002, McMahon & Rounsaville, 2002; Pelham & Lang, 1999) and anxiety (Steinberg & Steinberg, 1994). Parent-offspring conflict may maintain parental anxious arousal and alcohol use by increasing distress.

For example, conflict during adolescence can reciprocally elicit negative affect from both parents and adolescent offspring (Kim, Conger, Lorenz, & Elder, 2001). Additionally, increases in parent-offspring conflict during adolescence result in the amplification of both parent and adolescent emotional intensity (Laursen et al., 1998; Paikoff & Brooks-Gunn, 1991). Further, scholars have suggested that when alcohol is repeatedly used in response to negative emotions, the negative affective state can elicit drug use and craving (e.g., Bouton, 2000; Siegel, 1989; Stewart, de Wit, & Eikelboom, 1984). Accordingly, among parents with elevated anxious arousal who use alcohol, parent-child conflict likely elicits distress relatively frequently, and repeated drinking to dampen this distress results in a pattern of drinking to reduce conflict-elicited distress. This postulation is also consistent with social exchange theory and other work elucidating problematic drinking patterns in the context of social conflict and stress (Fox, Bergquist, Hong, & Sinha, 2007; Manuck, Kaplan, Muldoon, Adams, & Clarkson, 1991; Marlatt & Gordon, 1980; Marshal, 2003; Rook, Luong, Sorkin, Newsom, & Krause, 2012).

Reducing Conflict-Elicited Distress May Reduce Maternal Anxious Arousal and Alcohol Craving

The affective impact of parent-offspring conflict is likely malleable (Blake & Hamrin, 2007). For instance, distress reduction training decreases physiological arousal during interpersonal conflict (Ewart, Taylor, Kraemer, & Agras, 1984). Distress reductions skills such as cognitive reappraisal may be particularly helpful in this regard. Cognitive reappraisal refers to reinterpreting the meaning of emotion-eliciting situations to allow for more effective management of negative emotions (Gross, 2002). Laboratory evidence suggests that individuals who use cognitive reappraisal to consider an interpersonal conflict from a third-party perspective show reduced anger and distress than participants who were asked to ruminate on a conflict, or participants who were given no instructions (Ray, Wilhelm, & Gross, 2008). Further, cognitive reappraisal has successfully been employed to prospectively reduce martial conflict over a period of several years (Finkel, Slotter, Luchies, Walton, & Gross, 2013). Notably, by middle childhood, youth begin to engage in reappraisal strategies (Gullone, Hughes, King, & Tonge, 2010) suggesting that this is an intervention that may be particularly useful for managing parent-adolescent conflict.

Given the dyadic nature of parent-adolescent conflict, working with adolescents to reduce maternal conflict-elicited distress may hold promise above and beyond working with mothers alone. Indeed, adolescent factors influence the intensity of parent-child conflict. For instance, when children report elevated arousal (e.g., meet criteria for an anxiety disorder, report problems with anger regulation), parent-child conflict is more severe (Burt, Krueger, McGue, & Iacono, 2003; Edwards, Barkley, Laneri, Fletcher, & Metevia, 2001; Lewinsohn, Rohde, & Seeley, 1995; Smokowski, Cotter, Robertson, & Guo, 2013). The resulting elevated severity of parent-

adolescent conflict is likely to exacerbate the effects of conflict on parental anxiety and alcohol craving. It also is noteworthy that parents with anxiety disorders show relatively fewer benefits from parenting interventions (Maliken & Katz, 2013) and family-based treatments show promise for reducing symptoms of parental psychopathology (Meis et al., 2012). Indeed, family based treatments for psychological problems result in greater improvements in parental symptoms, parenting strategies, and offspring symptomology than alternative treatments (McKee et al., 2014). Therefore it stands to reason that teaching adolescents to employ distress reduction techniques to reduce conflict severity will likely yield effects on conflict-elicited distress beyond teaching parents alone these techniques, and reduced conflict-elicited distress will reduce parental anxiety and alcohol craving.

Primary Aim and Hypotheses

The proposed project therefore aimed to examine the unique and combined effects of training mothers and adolescents in distress reduction techniques in terms of conflict-elicited maternal distress as well as multimodal assessment of subsequent maternal anxiety and alcohol cravings. Mother-adolescent dyads were randomly assigned to one of four groups, wherein both, one, or neither member of the dyad underwent distress reduction training. The hypotheses within this aim were as follows.

Hypotheses 1 through 4. First, it was hypothesized that compared to all other groups, mothers in the group wherein both mother and adolescent receive training in distress reduction skills (i.e., cognitive reappraisal) would evidence lower mean heart rate both before and during the second conflict task than before and after the first conflict task (hypothesis 1), compared to other groups. Second, it was hypothesized that mothers in the group wherein both mother and adolescent receive training in distress reduction skills would evidence the lowest levels of pre-

conflict self-reported anxiety and post-conflict self-reported anxiety during the second conflict task (hypothesis 2) compared to other groups. Third, it was hypothesized that mothers in the group wherein both mother and adolescent receive training in distress reduction would self-report the lowest levels of pre-conflict arousal and post-conflict arousal during the second conflict task (hypothesis 3) compared to other groups. Finally, it was hypothesized that mothers in the group wherein both the mother and adolescent are trained in distress reduction would report the lowest levels of self-reported alcohol craving both before and after the second conflict task (hypothesis 4) compared to other groups.

Method

Design Overview

A 2 (mother distress reduction training/mother control) by 2 (adolescent distress reduction training/adolescent control) between-groups repeated measures design, with maternal conflict-elicited distress as the dependent variable (i.e., self-reported anxiety, physiological arousal, alcohol craving, and mean heart rate during conflict) was employed. Parent-adolescent dyads attended two laboratory sessions. Prior to session 1, screening measures determined eligibility. At session 1, a baseline assessment (including a standardized conflict task) measured baseline levels of factors related to primary hypotheses. Participants were then randomly assigned to complete either distress reduction training or a psychoeducation control condition. Mothers and their adolescent offspring spent one week either practicing the skills they were taught during training or studying information about adolescent development. Session two occurred one week later. During session two, participants engaged in a second conflict task followed by assessment of maternal anxiety and alcohol craving. Participants were also queried about their use of emotion regulation strategies during the conflict task as a manipulation check.

Participants

  Mothers high in past month anxious arousal, who endorsed path month alcohol use, and had an adolescent offspring between the ages of 12 and 16 years were recruited from the local community via radio-based advertising, flyers, and recruitment booths set up at various events. Elevated anxious arousal was defined as a score of at least 30 on the Anxious Arousal (AA) subscale of the Mood and Anxiety Symptoms Questionnaire (MASQ; Watson & Clark, 1991; Watson et al., 1995). Maternal alcohol use was operationalized as mothers reporting consuming at least one alcoholic drink in the past month. Exclusion criteria for mothers and adolescents in the study were as follows: a) current suicidal intent, b) current psychosis, and c) uncontrolled bipolar disorder. In order to participate, adolescents must have been between the ages of 12 and 16 and must have been able to read. Consistent with previous work (Whaley, Pinto, & Sigman, 1999), if families had multiple children who were eligible for the study, the adolescent whose age was closest to the middle of the target range (i.e., 14 years old) was selected to participate in the study.

  Sixty-two dyads completed the first session of the protocol. One dyad was excluded from all analyses due to the family's failure to comply with the experimental manipulation training and experimental procedures. Two dyads completed session one, but did not return for session two. The final sample was 59 mothers and their adolescent offspring (32 males) between the ages of 12 and 16 years old (M_{age} =13.78 years, SD =1.35 years). A portion of physiological data was missing from 17 participants due to problematic levels of data artifacts resulting from participant movement. Data for these participants were included in the self-report analyses and excluded from analyses employing physiological data. In addition, 6 mothers were missing some or part of

their data for the self-reported alcohol craving. Please see Table 1 for adolescent and parent characteristics as a function of condition.

Measures

  Parental Screening Assessment. Measures to index inclusionary/exclusionary criteria for parents were administered first.

  Anxious Arousal. The Anxious Arousal (AA) subscale of the MASQ (MASQ-AA; Watson & Clark, 1991; Watson et al., 1995) was used to assess anxious arousal. The MASQ has excellent psychometric properties (Watson et al., 1995) and was designed to index arousal specifically in the context of anxiety symptoms, as opposed to distress more broadly related to both anxiety and depression. Mothers indicated how much they had experienced feelings like, "I was afraid I was going to lose control," over the previous week on a 5-point scale (1 = *not at all* to 5 = *extremely*). Anxious Arousal was defined as a score of 30 or above on the AA subscale of the MASQ, which, across multiple studies, is the mean score among people with anxiety disorders (Boschen & Oei, 2007; Buckby, Yung, Cosgrave, & Cotton, 2007; Watson et al., 1995).

  Mental Health History. The Mini International Neuropsychiatric Interview (M.I.N.I; Sheehan et al., 1997) was used to identify current and lifetime histories of maternal Axis I diagnoses, and to assess maternal alcohol use. Only mothers endorsing past month alcohol use were included in the current study. The M.I.N.I was also used to identify exclusion criteria, including current suicidal intent, psychosis, and uncontrolled bipolar disorder, as these disorders are likely too severe to be managed effectively in a laboratory environment. The M.I.N.I has excellent psychometric properties (Sheehan et al., 1997).

Parental Baseline Assessment. Carefully selected measures were administered to examine baseline equivalence across conditions.

Recent Alcohol Use Patterns. In addition to the M.I.N.I., a past-month Timeline Follow-back (TLFB) interview was employed with mothers as a gold standard measure of recent alcohol use history (Sobell & Sobell, 1992). The TLFB was used to obtain estimates of past month percentage of days drinking, as well as past month average number or drinks per week. Memory aids, such as calendar days, key dates as anchors for drinking, and standard drink conversion tables, were used to assess the pattern, variability, and magnitude of an individual's past month alcohol use.

Family Conflict. The Parent–Child Conflict Tactics Scale (CTSPC; Straus, 1979, 2004; Straus, Hamby, Finkelhor, Moore, & Runyan, 1998) was used to measure baseline levels of familial conflict. The CTSPC is a self-report measure of parent-to-child aggression, which asks parents to report on the incidence and frequency of non-violent discipline, physical and psychological aggression, severe parental physical aggression, and very severe parental aggression. The CTSPC has excellent normative, reliability, and validity data (Bennett, Sullivan, & Lewis, 2006; Straus et al., 1998; Straus & Stewart, 1999; Straus & Field, 2003).

Adolescent Screening Assessment.

Mental Health History. The M.I.N.I for Children and Adolescents (M.I.N.I-KID; Sheehan et al., 2010) was used to identify offspring exclusionary criteria, including current suicidal intent, psychosis, and uncontrolled bipolar disorder. The M.I.N.I-KID has excellent psychometric properties (Sheehan et al., 2010).

Dependent Variables. A multi-modal assessment strategy was developed to measure arousal, anxiety, and alcohol craving in response to the conflict task.

Conflict-Elicited Distress. Psychophysiological aspects of maternal conflict-elicited distress were operationally defined as mean heart rate (HR) during the conflict. HR was measured using the Biopac MP 150 system. Acqknowledge 4 software was used for data acquisition and reduction. HR was measured via electrocardiogram (ECG) recording obtained with two pre-gelled Ag-AgCL disposable electrodes placed in a modified Lead II configuration. ECG data were sampled at 1000 Hz continuously throughout the conflict tasks. Mean maternal HR was calculated by averaging values obtained during the conflict task.

Self-reported maternal conflict-elicited distress was operationalized and measured in two ways. First, current level of arousal was indexed using the self-assessment manikin (SAM-A; Bradley & Lang, 1994). This scale measures three fundamental dimensions of affective responding: valence, arousal, and control. Each scale has five human like figures on which participants rate current levels of valence and arousal by placing an X over or between any of the five figures, which yields scores of 0 to 9. For the arousal scale, the figure on the father left appears to be exploding, while the figure on the farthest right appears to be asleep. Each scale yields a rating of 0 to 9 by having participants mark on or between figures with lower scores representing higher levels of arousal. Participants indicated current levels of self-reported arousal before and after each conflict task.

Second, self-reported anxiety following conflict was measured with a subjective units of distress scale measure (SUDS-A; Wolpe, 1958). Participants were asked to indicate self-reported anxiety on a scale of 0 to 100 (0 = *no anxiety* to 100 = *extreme anxiety*) both before and after each conflict task.

Alcohol Craving. Alcohol craving was measured using visual analog scale (VAS) ratings of alcohol craving (Coffey, 2010; Kozlowski et al., 1996). Mothers rated current levels of

craving by choosing a number between 0 and 100 with 0 meaning "No craving at all" and 100 meaning "The strongest craving you've ever experienced." Mothers reported on alcohol craving both before and after each conflict task.

Cognitive Reappraisal Strategies. Maternal use of cognitive reappraisal during the conflict task was assessed using the Emotional Regulation Interview (ERI; Werner, Goldin, Ball, Heimberg, & Gross, 2011). The ERI is a structured clinical interview based on Gross's (1998) process model of emotion regulation. Following each conflict task, mothers were asked to rate how frequently (0% = *never; or not at all* to 100% = *always*) they tried to change their thinking during the conflict task, and how successful they were (or would have been if the strategy was not used) at changing their thinking (0 = *not successful at all* to 100 = *completely successful*). Mothers were asked to make the same rating for emotional suppression, acceptance, situation modification, and distraction.

Homework Completion and Manipulation Check Materials. The number of days participants completed practice work as indicated by participants calling or emailing to confirm homework completion was tracked. At the start of session 2, the experimenter checked each participant's practice work to ensure that the practice was completed accurately and satisfactorily. The experimenter then recorded if the homework was completed satisfactorily.

Procedure

Session One: Informed Consent, Screening and Baseline Assessment, and Training. Interested mothers were invited to complete a phone screen version of the MASQ to determine if they met inclusion/exclusion criteria. Due to the rigorous telephone screening prior to the first laboratory visit, no participants were deemed ineligible in the laboratory. Upon arriving at the laboratory, dyads provided written informed consent and assent. Dyads then completed the

baseline assessment (including another MASQ-AA) and conflict task. Heart rate was monitored continuously throughout the conflict task. Maternal distress and alcohol cravings were assessed before and after the conflict task. The experimenter was partially blind to experimental condition, and did not learn the participant's condition until training began. Participants were then randomly assigned to one of four conditions, and completed training for their condition. Following training, participants were instructed to practice the trained skills/study the information for 15 minutes each day for one week. Participants were instructed in well-established methods for adhering to a daily "practice" schedule (Haynes et al., 2008). This involved effective communication of the importance of adherence (e.g., necessity of adherence for study validity), completing a session of training with the principle investigator (P.I.), followed by step-by-step, clear, unambiguous instructions for daily practice, scheduling a time to practice the procedure, and providing written instructions for participants to take home (Bowsworth, 2010; Cameron 1996; Robiner, 2005; Vermeire, Hearnshaw, Van Royen, & Denekens, 2001). Participants were also instructed to call the laboratory and leave a message on our voicemail system or to send an email to the experimenter confirming (with a time stamp) that the daily practice was completed.

Session Two: Fidelity Check, Post-Assessment, Debriefing, and Compensation.
Participants returned to the laboratory for the second session one week after the first session. Upon arrival to the laboratory, homework was checked for completeness and accuracy. Following the manipulation check, participants completed the second conflict task. Before and after the conflict task, maternal anxiety and alcohol cravings were assessed. Heart rate was monitored continuously throughout the conflict task. Upon completion of session two, electrodes were removed and participants were fully debriefed. As has been done in previous work

(Feldner, Smith, Monson, & Zvolensky, 2013; Feldner, Zvolensky, Babson, Leen-Feldner, & Schmidt, 2008), a weighted compensation schedule was employed as follows: $30 each for session one, $2 each for each day a call was made to confirm completion of daily practice, and $40 each for the final assessment. Collectively participants could have received up to $84 each for completing the study protocol, with each dyad receiving up to $168. See Figure 1 for a consort flow diagram depicting the flow of the study.

Conditions. The four conditions were: (1) parent and adolescent distress reduction, (2) parent distress reduction/adolescent control, (3) parent control/adolescent distress reduction, and (4) parent and adolescent control.

Distress Reduction Condition. Participants randomly assigned to the distress reduction condition completed a laboratory based training in cognitive reappraisal based on Finkel and colleagues' (2013) study, in which participants were instructed to think about conflict with their partner (either mother or adolescent offspring) by responding in writing to the six following prompts:

A neutral outsider is someone who doesn't want to choose you or your mother/child's side. They are a person who is not interested in "getting in the middle" and instead wants to help you and your mother/child agree on something. They want to find a way for you to both get what you want, or at least both feel like you are being treated nicely and fairly. Keep this definition in mind for the next few questions.

1. Think about a specific time recently where you and your mother/child did not agree about something. Please describe this time.

2. Think about this disagreement with your mother/child from the point of view of a neutral outsider who wants the best for you and your mother/child; a person who sees things from a neutral point of view (meaning he or she doesn't want to take sides). How might this person think about the disagreement?

3. How might he or she find the good that could come from it? How might he/she see good points in both you and your mother/child's point of view? In other words, what is the good point in your side, and what is the good point in your mother/child's side? ⌷SEP⌷

4. Some people find it helpful to take this neutral outsider point of view during their

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conversations with their mother/child. The thing is, almost everybody finds it hard to take this neutral outsider point of view at all times. In your relationship with your mother/child, what do you think would make it hard to take this neutral outsider point of view, especially when you're having a disagreement with your mother/child?

Even though there are things that make it hard to take a neutral outsider point of view, people can be good at doing this. Over the next week, please try your best to take this neutral outsider point of view during talks with your mother/child, especially during disagreements.

5. What would make you more likely to be able to take this point of view about conversations with your mother/child over the next week?

6. How might taking this point of view help you make the best of disagreements between you and your mother/child? ⌞SEP⌟

Participants assigned to the distress reduction condition completed a laboratory-based training in cognitive reappraisal during session 1 and completed their first homework assignment with the assistance of the experimenter. They were then asked to write responses to the six prompts for 15 minutes each day for one week. Parents and adolescents were also provided with psychoeducation about anxiety and cognitions.

Control Condition. The control condition involved psychoeducation about adolescent development. Topics discussed included information about adolescent brain development. Participants completed their first homework assignment with the assistance of the experimenter. Participants were given information about adolescent brain development and were asked to 15 minutes each day for one week responding in writing to the six following prompts:

The human brain continues to develop into our early to mid-twenties. Many of the changes that emerge are changes in gray matter. We had you read a handout about the teenage brain, because it can be helpful to learn facts about the brain. The brain plays an important role in our ability to think, breathe, and stay healthy. Keep this handout in mind for the next few questions.

1. Think about what you read about the adolescent (or teenage brain). What was the most interesting thing you learned about from the handout?

2. Why did you find that interesting?

3. What was the most surprising thing that you learned from the handout? Is there anything else that is interesting to you about the handout?

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4. Some people find it helpful to learn about the adolescent brain. The thing is, almost everybody finds it hard to understand facts about the brain. What do you think makes it hard to understand the reading about the adolescent brain?

Despite the things that make it hard to remember facts about the adolescent brain, people can be good at doing this. Over the next week, please try your best to remember some facts about the adolescent brain.

5. What are some strategies you can use to help yourself remember facts about the adolescent brain?

6. What good might come from you remembering facts about the brain?

Conflict Task. Mothers and adolescents first separately rated the frequency and intensity of a number of common conflictual topics in adolescent-parent relationships (e.g., chores, curfew) on the well-validated Issue's Checklist (Robin &Foster, 1989). Answers were used to identify four topics to be discussed during the dyadic interaction task (two during the first session and two during the second session). Experimenters selected topics based on (1) overlap between mother and adolescent and (2) most conflictual as indexed by the product of the frequency by intensity ratings. Once conflictual topics were identified, mothers were outfitted with passive electrodes to continuously monitor HR as described above. Then, the dyad engaged in the 10-min dyadic conflict task.

The experimenter provided participants with the first topic for discussion, referencing a topic identified by the dyad as a source of significant conflict, and asked participants to discuss the topic and seek a resolution for five minutes. After five minutes the experimenter returned and asked the mothers to make a set of ratings to indicate their levels of conflict elicited distress and alcohol craving. Then the experimenter prompted mothers and adolescents to use the next five minutes to discuss the previous topic, or if they have reached a solution, to move onto a second topic provided by the experimenter at that time. After five minutes elapsed, mothers were asked make a second set of ratings of the dependent variables.

Results

Preliminary Analyses.

Checks of the efficacy of random assignment. Conditions were compared in terms of theoretically relevant dichotomous (i.e., offspring gender, presence of a parental anxiety/trauma disorder) and continuous (i.e., maternal: MASQ AA scores, TLFB-measured alcohol use patterns, CTSPC) variables at baseline to check the efficacy of random assignment. Scores on MASQ-AA, and parental use of severe and very severe physical tactics were skewed and kurtotic; accordingly, data from these measures were transformed using the log transformation (MASQ-AA) and square root transformation (parental use of severe and very severe physical tactics) prior to primary analyses (Field, 2014). Chi-square analyses indicated that there were no group differences in terms of offspring gender [$\chi^2(3) = 3.11$, $p = .375$], or the presence of a parental anxiety or trauma disorder [$\chi^2(3) = 1.35$, $p = .717$]. A series of ANOVA analyses indicated that there were no group differences in terms of offspring age [$F(3, 54)= 1.07$, $p= .369$], maternal MASQ AA scores [$F(3,50) = .361$, $p = .782$], maternal past month percentage of days drinking [$F(3, 54)= 1.05$, $p= .380$], or maternal average numbers of alcoholic drinks per day [$F(3, 55)= 1.81$, $p= .966$]. There were also no group differences in terms of non-violent parental discipline [$F(3, 46)= 1.25$, $p= .301$], parental use of psychological aggression [$F(3, 47)= 0.11$, $p= .952$], parental use of physical aggression [$F(3, 50)= 1.39$, $p= .257$], parental use of severe aggression [$F(3, 46)= 1.48$, $p= .233$], or very severe parental physical aggression [$F(3, 47) = 1.85$, $p= .151$]. This pattern of results suggests that random assignment was effective. Therefore, no covariates were included in the primary analyses described below.

Manipulation check of condition. First, an ANOVA indicated that there were no significant differences between groups in terms of number of days that practice work was

completed [$F(3, 55)= 1.92, p= .137$]. Second, there were no significant difference between groups in terms of the adequacy of completed practice work [$F(3, 55)= 0.98, p= .410$]. In terms of cognitive re-appraisal use, after controlling for the percentage of time reappraisal was used during the e first conflict task, there were no differences between mothers who received distress reduction training ($M = 38.54$) versus mothers who received training about adolescent development ($M = 36.86$) in terms of frequency of re-appraisal use [$F(1, 56)= 0.06, p= .815$]. This suggests there was no significant change in the frequency of reappraisal use during the conflict task following training. In addition, although the means were in the expected directions, after controlling for how successful on a 0 to 100 scale mothers felt at using reappraisal after the first conflict task, there were no differences between mothers who received distress reduction training ($M = 71.16$) versus mothers who received training about adolescent development ($M = 60.60$) in terms of maternal success at using re-appraisal [$F(1, 56)= 2.42, p= .126$]. This suggests that mothers did not feel significantly more successful at using reappraisal during conflict following distress reduction training.

Descriptive statistics and correlations. Descriptive statistics and correlations were computed. See Tables 2-5 for descriptive information and zero-order correlations. Maternal MASQ-AA scores were positively correlated with maternal anxiety disorder status and maternal anxiety during the task. Maternal percentage of days drinking was positively associated with the average number of maternal drinks per weeks. Finally, the dependent variables post conflict tended to correlate positively to the baseline levels of the dependent variables.

Primary Analyses

Maternal response during task. Four separate mixed linear models with maximum likelihood estimation were employed to examine the effects of experimental condition on

changes in maternal mean heart rate, maternal self-reported anxiety, maternal self-reported arousal, and maternal self-reported alcohol craving during the experiment. Linear mixed models were employed due to their ability to handle missing data (Field & Wright, 2011). Further, mixed linear models allow for estimates of individual and group level changes across time and appropriate modeling of covariance structures when observations are correlated across time (Singer & Willett, 2003). Unstructured covariance matrices were employed in all models. Time was centered at its mean prior to all analyses. A number of models were run to determine the model of best fit. Individual participants were considered level 2 predictors. First, intercept was entered as a random effect, followed by the fixed main effects of the linear effect of time, the quadratic effect of time, and experimental condition, as well as the interaction between experimental condition and time. Second, a model identical to the model above was run, but the slope across linear time was allowed to vary randomly. Third, a model identical to the model above was run, but the slope across quadratic time was allowed to vary randomly. Finally, a model identical to the model above was run with the slope of experimental condition allowed to vary randomly. Criterion variables for the response through the experimental period were comprised of the repeated assessments of the HR, SUDS-A, and SAM-A scores, and self-reported alcohol craving. The Parent Control/Adolescent Control condition was coded as 1, the Parent Distress Reduction/Adolescent Control condition was coded as 2, the Parent Control/Adolescent Distress Reduction condition was coded as 3, and the Parent Distress Reduction/Adolescent Distress Reduction condition was coded as 4 for primary analyses.

Maternal heart rate. Chi square tests indicated that the best fitting model for maternal heart rate, $\chi^2 (20) = 63.39$, $p < .001$, was a random intercepts model, with the slope of the linear effect of time allowed to vary randomly. In terms of random effects, the relation between

experimental condition and maternal heart rate showed significant variance in intercepts across participants, SD = 10.03 (95% CI: 8.29, 12.15). Similarly, the slopes of time, SD = 1.59 (95% CI: 1.23, 2.06), varied significantly across participants. Finally, the slopes and intercepts were not significantly correlated, r = -0.15, (-0.42, 0.16).

As detailed in Table 6, in terms of fixed effects, there was not a significant relation between linear time, quadratic time, or experimental condition on maternal HR during the task. The interaction between time and condition was not significant.

Maternal self-reported anxiety. Chi square tests indicated that the best fitting model for maternal SUDS-A, χ^2 (23) = 14.66, p = .002, was a random intercepts model, with the slopes of the linear and quadratic effect of time allowed to vary randomly. In terms of random effects, the relation between experimental condition and maternal SUDS-A showed significant variance in intercepts across participants, SD = 15.78 (95% CI: 12.60, 19.73). Similarly, the slopes of time, SD = 4.77 (95% CI: 3.71, 6.11), and the quadratic effect of time SD = 1.97(95% CI: 1.36, 2.87), varied significantly across participants. Finally, the slope of the linear effect of time and intercept [r = 0.22, (-0.11, 0.51)] as well as the quadratic effect of time and intercept [r = -0.07, (-0.45, 0.33)] were not significantly correlated.

As detailed in Table 7, in terms of fixed effects, there was not a significant relation between linear time or experimental condition on maternal SUDS-A during the task. There was a significant quadratic effect of time on maternal SUDS-A such that maternal self-reported anxiety increased following the second conflict task. The interaction between time and condition was not significant. Means were partially in the expected direction such that mothers in the condition in which neither mothers or offspring received the distress reduction training reported the highest

level of anxiety after the second conflict task, however these differences did not reach statistical significance (See Figure 3).

Maternal self-reported arousal. Chi square tests indicated that the best fitting model for maternal SAM-A, χ^2 (27) = 22.81, p = .002, was a random intercepts model, with the slopes of the linear and quadratic effect of time allowed to vary randomly. In terms of random effects, the relation between experimental condition and maternal SAM-A showed significant variance in intercepts across participants, SD = 1.48 (95% CI: 1.19, 1.82). Similarly, the slopes of time, SD = 0.61 (95% CI: 0.42, 0.91), and the quadratic effect of time SD = 0.18 (95% CI: 0.13, 0.25), varied significantly across participants. Finally, the slope of the linear effect of time and intercept [r = -0.06, (-0.53, 0.44)] as well as the quadratic effect of time and intercept [r = -0.26, (-0.54, 0.44)] were not significantly correlated.

As detailed in Table 8, in terms of fixed effects, there was not a significant relation between linear time, quadratic time, or experimental condition on maternal SAM-A during the task. The interactions between linear time, quadratic time, and condition were not significant. Means were partially in the expected direction such that mothers in the condition in which neither mothers or offspring received the distress reduction training reported the highest levels of arousal after the second conflict task than mothers in other conditions, however these differences did not reach statistical significance (See Figure 4).

Maternal self-reported alcohol craving. Chi square tests indicated that the best fitting model for maternal alcohol craving χ^2 (27) = 8.21, p = .017, was a random intercepts model, with the slopes of the linear effect of time allowed to vary randomly. In terms of random effects, the relation between experimental condition and maternal alcohol craving showed significant variance in intercepts across participants, SD = 6.03 (95% CI: 4.40, 8.27). Similarly, the slopes

of time, $SD = 1.41$ (95% CI: 0.66, 2.99), varied significantly across participants. Finally, the slope of the linear effect of time and intercept [$r = -0.96$, (-1.0, 0.97)], were not significantly correlated.

As detailed in Table 9, in terms of fixed effects, there was not a significant relation between linear time, quadratic time, or experimental condition on maternal alcohol craving during the task. The interactions between linear time, quadratic time, and condition were not significant. Means were in the expected direction such that mothers in the condition in which neither mothers or offspring received the distress reduction training reported the highest level of alcohol craving after the second conflict task, while mothers in the condition in which both mothers and adolescents received distress reduction training reported the lowest levels of alcohol craving after the second conflict task, however these differences did not reach statistical significance (See Figure 5).

Discussion

A large body of work has demonstrated that disorders characterized by anxious arousal tend to co-occur with hazardous alcohol use (Grant et al., 2004; Kessler et al., 1997; Kushner et al., 2000). Elevated distress during interpersonal conflict is likely to maintain both alcohol use and anxiety psychopathology. Conflict levels between mothers and adolescents tend to be high among families in which mothers use alcohol and have disorders characterized by anxious arousal (Barrera et al., 1995; Drake & Kearny, 2008; Hussong & Chassin, 2002; Keller et al., 2008). Critically, the affective impact of parent-adolescent conflict is malleable (Blake & Hamrin, 2007). Previous evidence suggests that distress reduction skills, such as cognitive reappraisal, can be used to improve relationship quality (Finkel et al., 2013). Therefore, cognitive reappraisal skills have the potential to reduce distress elicited by mother-adolescent conflict,

which may in turn reduce maternal anxiety and drinking-related behavior potentiated by conflict. No study to date, however, has examined the impact of mother and adolescent distress reduction training on maternal conflict elicited anxiety and alcohol craving. This study was designed to address this gap in the literature, by examining the unique and combined effects of maternal and adolescent distress reduction training on the following maternal variables assessed in response to a mother-adolescent conflict task: 1) heart rate, 2) self-reported anxiety, 3) self-reported arousal, and 4) self-reported alcohol craving.

First, and contrary to the first hypothesis, for which heart rate was expected to be lowest both before and during a second conflict task for dyads where both mother and adolescent received distress reduction training, there was no significant effect of experimental condition. Interestingly, there was some evidence of training effects; mothers who received distress reduction training evidenced lower mean heart rate during conflict than mothers who did not receive training, however these differences were small and did not reach statistical significance. Further, heart rate was not lowest for the mother/adolescent training condition. There are a number of possible explanations for this pattern of findings. First, there was not a significant increase in average heart rate from pre- to post conflict during the baseline conflict task. The conflict task may not have been distressing enough to increase mothers' mean levels of heart rate during the task. Training would, therefore, do little to reduce heart rate that was not elevated. Critically, previous evidence found that parents' heart rate tended to change over the course of a conflict conversation; specifically, Zhang and colleagues (2017) found that parental heart rate tended to accelerate during conflictual aspects of a conflict conversation, and decelerate during the resolution phase of the conflict conversation with their offspring. This suggests that that analyzing average heart rate across the entire procedure (average beats per minute, BPM) may

not have captured more subtle changes in physiological arousal that mothers may have been experiencing during conflict. It may have been beneficial to look at smaller incremental changes in heart rate. In addition, employing a different physiological index to examine changes in physiological arousal using may have resulted in a larger effect. For example, evidence suggests that increases in respiratory sinus arrhythmia (RSA) during social interaction can reflect emotion regulation and self-regulatory efforts (Butler, Wilhelm, & Gross, 2006). Further, RSA has been demonstrated to figure prominently in emotional responding (Demaree, Robinson, Everhart, & Schmeichel, 2004). Critically, increases in RSA are thought to reflect increased efforts to reappraise or suppress during social interaction (Butler et al., 2006). In addition, recent work suggests that changes in RSA can reflect different patterns of parenting practices; for example, among abusive mothers of toddlers, RSA suppression is associated with initial increases in positive parenting followed by significant increases in hostile and controlling parenting tactics during an interaction task (Skowron, Cipriano-Essel, Benjamin, Pincus, & Van Ryzin, 2013). This suggests that maternal efforts to regulate affect during interactions with offspring may have unique physiological markers that can signal both parental effort, and parental fatigue. Perhaps a more nuanced assessment of maternal physiological arousal may have detected effects in this domain. Future work should endeavor to examine if differences in physiological arousal emerge as a function of distress reduction training when considering RSA during mother-adolescent conflict.

Second, and also contrary to hypotheses, there was not a significant effect of experimental condition on maternal anxiety during the conflict task. Critically, as depicted in Figure 3, maternal anxiety did not get very high over the course of the conflict task. Although some mothers rated their anxiety as being as high as 100 on a 0 to 100 scale after the conflict

task, the average scores ranged from 15 to 22. This indicates that most mothers did not report significantly increased anxiety after the conflict task. This may be because disagreement between parents and adolescents is a common occurrence (Laursen & Collins, 2009). Most conflict among mothers and adolescents is characterized by disagreements about day-to-day topics (Hill, 1988), which are often resolved by one party either submitting to the others perspective, or by both parties agreeing to disagree (Laursen, 1993). Critically, this can result in a situation where one party "wins," while another "loses," resulting in neutral or angry affect (Adams & Laursen, 2001; Laursen & Collins, 2009). Further, parents and adolescents tend to view these conflicts differently, with parents more likely to view changes in the parent child relationship as a sign of rejection, or of a deteriorating relationship, while adolescents may view conflict as an acknowledgement of maturity and an increasingly egalitarian relationship (Laursen & Collins, 2009). Therefore, anxiety may not characterize mothers' responses to the conflict task. Instead, mothers' responses may be characterized more by changes in their ratings of anger, happiness, or sadness. In addition, mothers' affective reactions to parent-adolescent conflict may be influenced by offspring gender. Evidence suggests that conflict between mothers and daughters tends to be more intense, and is characterized by higher levels of negative affect than conflict between mothers and sons (Laursen & Collins, 1994). Although it was outside the scope of the current study to examine the moderating effects of gender, moving forward it may be critical to examine if the effects of distress reduction training differ as a function of offspring gender. It may be that mothers and daughters benefited from the training, while mother and sons show less of an improvement. Finally, it is also possible that distress reduction training is ineffective at reducing maternal anxiety. Future work should endeavor to disentangle these issues, by examining

differences in other maternal emotions (e.g., happiness, sadness, anger), and different patterns of responding as a function of offspring gender, in response to distress reduction training.

Third, and contrary to hypotheses, there was not a significant effect of experimental condition on maternal self-reported arousal during conflict. As depicted in Figure 4, means were in the expected direction such that mothers in the mother control/adolescent control condition reported feeling more aroused during the second conflict task than mothers in other groups, although these differences were minor, and did not meet statistical significance. Further, contrary to hypotheses, mothers in the mother/adolescent distress reduction condition did not report the lowest levels of arousal prior and during the second conflict task. One explanation for this null finding may be the relatively low levels of parents who meet criteria for an anxiety or traumatic stress disorder in this sample. As noted in Table 1, only about a third of the mothers in this sample met criteria for an anxiety or traumatic stress disorder. Further, rates of depression were relatively high in this sample, with about 20% of the sample meeting criteria for a current depressive episode, and 55% percent of the sample meeting criteria for a past depressive episode. In light of evidence that depression is characterized by low levels of physiological arousal (Watson, 2005), physiological arousal may have been relatively dampened in the sample. Indeed, as depicted in Figure 4, most parents reported feeling relatively low levels of physiological arousal across conflict tasks, indicating that there may have been little opportunity to for their arousal to be decreased by training. It also merits consideration that reappraisal may not have been an effective strategy for reducing self-reported arousal. The type of reappraisal utilized in the current project has been demonstrated to be effective in reducing anger, reducing distress, and improving relationship quality (Finkel et al., 2013; Ray et al., 2008). A more exposure-based intervention may have been more appropriate for symptoms of arousal. The gold standard

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treatment for disorders characterized by fear and anxious arousal (e.g., panic disorder, PTSD) are exposure-based treatments, while disorders characterized more by distress [e.g., Generalized Anxiety Disorder (GAD), depression] are often treated more effectively by cognitive reappraisal (Barlow, 2002). This suggests that intervention employed in this study may not have been effective for reducing arousal-based symptoms. Examining the effects of the reappraisal training on more broadband symptoms of distress may have yielded different results. Finally, learning to effectively reappraise conflict is a complicated skill. Manipulation checks indicated that there were no significant differences between mothers who received distress reduction training and mothers who did not in terms of reappraisal use during the conflict. Interestingly, mothers who received distress reduction training reported more anticipated success ($M = 71.16$, 0-100 scale) in using reappraisal than mothers who did not receive the training ($M = 60.60$, 0-100 scale), although this difference was not statistically significant. It may be that with practice, more robust effects may have emerged between groups. More work is needed to test this postulation.

Finally, and contrary to hypothesis 4, there was not a significant effect of experimental condition on maternal self-alcohol craving during conflict. As depicted in Figure 5, although means were in the expected direction, such that mothers in the mother /adolescent distress reduction condition reported reduced alcohol craving during the second conflict task, these differences were small and did not reach statistical significance. One factor that may have contributed to this was the relatively low level of maternal alcohol use in this sample. The current study utilized a very liberal inclusion criterion for alcohol use (i.e., "have you consumed at least one alcoholic drink in the past month"). Although, as noted in Table 1, about 20% of the mothers included in the sample met criteria for an AUD, the average past month number of drinks per week was low in the sample ($M = 3.65$, $SD = 4.36$) as was the average past month

percentage of days drinking ($M = 29.10$, $SD = 28.45$). Indeed, as depicted in Figure 5, most mothers reported very low levels of alcohol craving prior to the first or second conflict task, and change in craving levels across the conflict task was minimal. This suggests a floor effect may have contributed to null effects. Future work would benefit from recruiting a sample of mothers that reported using alcohol at higher levels (e.g., Keller, Cummings, Davies, & Mitchell, 2008) to examine if this pattern of results differs.

A number of additional limitations merit consideration. First, the current study appears to be underpowered to detect a number of effects. Although initial power analyses suggested that there would be a large effect of cognitive reappraisal on conflict elicited distress, the current study only included between 14 and 15 parents per condition. It is possible that with a larger sample, some of these trends may have reached statistical significance. Second, as noted above, cognitive reappraisal is a fairly complex emotion regulation strategy that can take a significant amount of time to master. For example, in Finkel and colleagues (2013) study, dyads practiced cognitive reappraisal several times over the course of a year before changes in their relationship quality were assessed. In contrast, mothers and adolescents in the current study only practiced for a week, which may not have been enough time to master cognitive reappraisal. Interestingly, although there were no group differences in the frequency of reappraisal use during conflict, mothers who received distress reduction training reported that they anticipated more successful use of reappraisal than mothers who did not receive the training; however, these differences did not reach statistical significance. Although mothers were beginning to feel more able to use reappraisal, they were not actively using it in the conversation task. This notion is consistent with Gross's (1998) assertion that reappraisal is an antecedent focused emotion regulation strategy, meaning that cognitive reappraisal is an emotion regulation strategy employed *before* an emotion

is generated. This suggests that if this intervention were to be successful, mothers and adolescents should have been engaging in reappraisal prior to their affective response to the task. In addition, as noted above, this study took place over a relatively circumscribed time period (i.e., one week). Future work would benefit from examining changes in the parent- adolescent relationship following this intervention over a longer period of time (e.g., one year, Finkel et al., 2013), as this may demonstrate longer-term effects of cognitive reappraisal on parent adolescent interactions. Third, although evidence suggests that children as young 4 to 10 years old can complete reappraisal tasks, these tasks were relatively simple, and were guided (e.g., Imagine that a picture of a crying family was, "a family crying because they were happy they just won a big prize"; Dougherty, Blankenship, Spechler, Padmala, & Pessoa, 2015). Further, results of neuroimaging work suggest that the neural substrates underpinning emotion regulation undergo significant changes as youth move from childhood into adolescence, and adolescence into young adulthood (e.g., McCrae et al., 2012). Youth included in the current study were between 12 and 16 years of age, and the younger adolescents may have had difficulty engaging in the cognitive reappraisal training effectively. Future work should examine how offspring age can affect the utility of cognitive reappraisal. Finally, the sample included in the current study was relatively homogenous. As noted in Table 1, the dyads that participated in this study primarily identified as Caucasian. Enrolling a more heterogeneous sample would enhance the generalizability of these findings.

Evidence suggests that elevated distress during interpersonal conflict is likely to maintain both alcohol use and anxiety psychopathology. Therefore, the aim of the current study was to examine the unique and combined effect of training adolescents and mothers distress reduction techniques in order to reduce the impact of maternal conflict elicited distress and alcohol

craving. Findings provided little support that maternal and adolescent distress reduction training is effective in reducing maternal physiological or psychological effects of conflict, including heart-rate, anxiety, arousal, and self-reported alcohol craving. Additional work is needed to elucidate if the intervention is ineffective, or if perhaps distress reduction training may have had an effect on other factors. For example, future research could examine the efficacy of distress reduction training on other, theoretically relevant, maternal factors, such as broadband indices of maternal distress, mother-adolescent relationship quality, and maternal heart rate variability during conflict. The current findings lay the groundwork for such future studies in this important area.

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Appendix

Table 1

Descriptive Data for Parent and Child Demographic Variables and
Theoretically Relevant Variables as a Function of Group

	Group				
	Mother Control/Adolescent Control	Mother Distress Reduction/Adolescent Control	Mother Control/Adolescent Distress Reduction	Mother Distress Reduction/Adolescent Distress Reduction	Total sample
	M or *n* (*SD* or %)	*M* or *n* (*SD* or %)	*M* or *n* (*SD* or %)	*M* or *n* (*SD* or %)	*M* or *n* (*SD* or %)
Child Theoretically Relevant Variables					
Age	13.77 (1.63)	13.64 (1.28)	14.36 (1.34)	13.46 (1.56)	13.81 (1.39)
Gender (Male)	10 (66.7%)	10 (62.5%)	5 (33.3%)	8 (57.1%)	33 (55.9%)
Grade					
Sixth	1 (6.7%)	0 (0.0%)	1 (6.7%)	1 (7.1%)	3 (5.1%)
Seventh	4 (26.7%)	5 (33.3%)	2 (13.3%)	7 (50.0%)	18 (30.5%)
Eighth	2 (13.3%)	2 (13.3%)	3 (20.0%)	1 (7.1%)	8 (13.6%)
Ninth	3 (20.0%)	5 (33.3%)	3 (20.0%)	1 (7.1%)	12 (20.3%)
Tenth	3 (20.0%)	2 (13.3%)	3 (20.0%)	2 (14.3%)	10 (16.9%)
Eleventh	1 (6.7%)	1 (6.7%)	3 (20.0%)	2 (14.3%)	7 (11.9%)
Race/Ethnicity*					
Caucasian	11 (73.3%)	13 (86.7%)	13 (86.7%)	11 (78.6%)	48 (81.4%)
Asian	--	--	--	--	--
African American	2 (13.3%)	1 (6.7%)	--	--	3 (5.1%)
Native American	--	--	--	1 (6.7%)	1 (1.7%)
Hispanic/Latino	--	1 (6.7%)	1 (6.7%)	1 (6.7%)	3 (5.1%)
Multiple race	1 (6.7%)	--	1 (6.7%)	1 (6.7%)	3 (5.1%)
Other	1 (6.7%)	1 (6.7%)	1 (6.7%)	--	3 (5.1%)
Parent					
Age	40.13 (5.78)	44.73 (5.92)	40.57 (5.95)	43.57 (8.14)	42.26 (6.63)

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Table 1

Descriptive Data for Parent and Child Demographic Variables and Theoretically Relevant Variables as a Function of Group Cont.

	Group				Total sample
	Mother Control/Adolescent Control	Mother Distress Reduction/Adolescent Control	Mother Control/Adolescent Distress Reduction	Mother Distress Reduction/Adolescent Distress Reduction	
	M or n (SD or %)	M or n (SD or %)	M or n (SD or %)	M or n (SD or %)	M or n (SD or %)
Race/Ethnicity*					
Caucasian	13 (86.7%)	15 (100%)	13 (92.9%)	14 (93.3%)	55 (93.2%)
Asian	--	--	--	--	--
African American	3 (20.0%)	--	--	1 (6.7%)	4 (6.8%)
Native American	2 (13.3%)	--	1 (7.1%)	--	3 (5.1%)
Hispanic/Latino	--	--	--	1 (6.7%)	1 (1.7%)
Multiple race	--	--	--	--	--
Annual Household Income					
< $20,000	2 (13.3%)	1 (6.7%)	3 (21.4%)	1 (6.7%)	7 (11.9%)
$20,001 – $40k	3 (20.0%)	2 (13.3%)	1 (7.1%)	7 (46.7%)	13 (22.0%)
$40,001 - $60k	2 (13.3%)	--	3 (21.4%)	3 (20.0%)	8 (13.6%)
$60,001 - $70k	1 (6.7%)	1 (6.7%)	2 (14.3%)	--	4 (6.8%)
$70,001 - $90k	3 (20.0%)	4 (26.7%)	2 (14.3%)	--	9 (15.3%)
$90,001 – $100k	0 (0.0%)	3 (20.0%)	--	1 (6.7%)	4 (6.8%)
> $100k	4 (26.7%)	4 (26.7%)	3 (21.4%)	3 (20.0%)	14 (23.7%)
Marital Status					
Single	2 (13.3%)	2 (13.3%)	1 (7.1%)	3 (20.0%)	8 (13.6%)
Married	12 (80.0%)	12 (80.0%)	7 (50.0%)	9 (60.0%)	40 (67.8%)
Divorced	1 (6.7%)	1 (6.7%)	4 (28.6%)	3 (20.0%)	9 (15/3%)
Separated	--	--	2 (14.3%)	--	2 (3.4%)

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Table 1

Descriptive Data for Parent and Child Demographic Variables and Theoretically Relevant Variables as a Function of Group Cont.

	Group				Total sample
	Mother Control/Adolescent Control	Mother Distress Reduction/Adolescent Control	Mother Control/Adolescent Distress Reduction	Mother Distress Reduction/Adolescent Distress Reduction	
	M or *n* (*SD* or %)	*M* or *n* (*SD* or %)	*M* or *n* (*SD* or %)	*M* or *n* (*SD* or %)	*M* or *n* (*SD* or %)
Past Depressive Episode	3 (20.0%)	1 (6.7%)	2 (14.3%)	4 (26.7%)	10 (16.9%)
Parent Theoretically-Relevant Variables					
Anxiety or Traumatic Stress Disorder	4 (26.7%)	6 (40.0%)	5 (35.7%)	7 (46.7%)	22 (37.3%)
Current Depressive Episode	3 (20.0%)	1 (6.7%)	1 (7.1%)	5 (33.3%)	10 (16.9%)
Past Depressive Episode	9 (60.0%)	9 (60.0%)	10 (71.4%)	6 (40.0%)	34 (57.6%)
Alcohol Use Disorder	1 (6.7%)	3 (20.0%)	3 (21.4%)	4 (26.7%)	11 (18.6%)
MASQ-AA	26.69 (6.93)	28.71 (9.09)	27.2 (6.87)	31.21 (14.02)	28.65 (9.64)
TLFB- %	26.61 (27.89)	36.29 (31.43)	19.37 (18.23)	34.50 (34.15)	29.24 (28.70)
TLFB-Avg	3.95 (5.90)	3.60 (3.46)	3.18 (4.17)	3.90 (4.09)	3.67 (4.39)

Note. N = 59; n= 15 (Mother Control/Adolescent Control); n = 15 (Mother Distress Reduction/Adolescent Control); n= 14 (Mother Control/Adolescent Distress Reduction); n = 15 (Mother Distress Reduction/Adolescent Distress Reduction); MASQ-AA= Mood and Anxiety Symptoms Questionnaire- Anxious Arousal Subscale; TLFB-% = percentage of past month days drinking on Timeline Follow Back; TLFB-Avg = Average number of past month drinks per week on Timeline Follow Back.
Note. Race and ethnicity do not sum to 100 because participants could chose more than one race.

Table 2

Correlations Among Maternal Conflict-Elicited Anxiety and Inclusion Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1	1	.048	.104	.010	.056	-.009	.178	.043	.087	.132	.152	.127
2		1	.060	0.131	.078	.039	-.166	-.057	-.117	.035	.125	.023
3			1	.413**	-.062	-.003	.299*	0.231	.296*	0.162	.286*	.283*
4				1	-.010	-.136	.050	.195	.342**	.054	.189	.195
5					1	.884***	.124	.117	.108	.182	.021	-.102
6						1	.180	.051	-.018	.156	-.019	-.149
7							1	.549***	.335*	.387**	.354**	.394**
8								1	.826***	.475***	.454***	.388**
9									1	.395**	.430**	.380**
10										1	.758***	.662***
11											1	.855***
12												1

Note: $N = 59$. 1 = Offspring Gender; 2 = Offspring Age; 3 = MASQ Anxious Arousal; 4 = Parental Anxiety or Trauma Disorder; 5 = TLFB Monthly Average Number of Drinks per Week; 6 = TLFB Monthly Percent of Days Drinking; 7 = Baseline Anxiety Conversation 1; 8 = Post Conflict Anxiety 1 Session 1; 9 = Post Conflict Anxiety 2 Session 1; 10 = Baseline Anxiety Conversation 2; 11 = Post Conflict Anxiety 1 Session 2; 12 = Post Conflict Anxiety 2 Session 2

* $p < .05$, ** $p < .01$, *** $p < .001$.

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Table 3

Correlations Among Maternal Conflict-Elicited Arousal and Inclusion Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1	1											
2	.048	1										
3	.104	.060	1									
4	.010	.131	.413**	1								
5	.056	.078	-.062	-.010	1							
6	-.009	.039	-.003	-.136	.884**	1						
7	-.110	.014	-.059	.056	.084	.089	1					
8	-.032	.088	-.020	.019	.061	.112	.646***	1				
9	-.012	.032	.023	.063	.050	.091	.489***	.874***	1			
10	-.198	.038	.159	.349**	-.018	-.028	.382**	.445***	.383**	1		
11	-.181	-.024	.008	.231	.023	.043	.576***	.699***	.625***	.760***	1	
12	-.044	.028	.035	.005	.094	.137	.654***	.588***	.513***	.461***	.724***	1

Note: N = 59. 1 = Offspring Gender; 2 = Offspring Age; 3 = MASQ Anxious Arousal; 4 =Parental Anxiety or Trauma Disorder; 5 = TLFB Monthly Average Number of Drinks per Week; 6 = TLFB Monthly Percent of Days Drinking; 7 = Baseline Arousal Conversation 1; 8 = Post Conflict Arousal 1 Session 1; 9 = Post Conflict Arousal 2 Session 1; 10 = Baseline Arousal Conversation 2; 11 = Post Conflict Arousal Conversation 2; 11 = Post Conflict Arousal 1 Session 2; 12 = Post Conflict Arousal 2 Session 2

* *p* < .05 , ** *p* < .01 , *** *p* < .001.

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Table 4
Correlations Between Maternal Heart Rate during Conflict and Inclusion Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1	1	.048	.104	.010	.056	-.009	.187	.231	.228	.167	.173	.139
2		1	.060	.131	.078	.039	.179	.133	.195	-.042	-.013	-.031
3			1	.413**	-.062	-.003	.187	.165	.203	.126	.143	.093
4				1	-.010	-.136	.268	.167	.137	.223	.245	.237
5					1	.884***	.165	.199	.210	-.049	-.068	-.047
6						1	.151	.175	.262	-.065	-.082	-.076
7							1	.934***	.923***	.780***	.787***	.793***
8								1	.958***	.787***	.831***	.835***
9									1	.781***	.805***	.799***
10										1	.945***	.943***
11											1	.972***
12												1

Note: N = 59. 1 = Offspring Gender; 2 = Offspring Age; 3 = MASQ Anxious Arousal; 4 =Parental Anxiety or Trauma Disorder; 5 = TLFB Monthly Average Number of Drinks per Week; 6 = TLFB Monthly Percent of Days Drinking; 7 = Baseline HR Conversation 1; 8 = Post Conflict HR 1 Session 1; 9 = Post Conflict HR 1 Session 1; 10 = Baseline HR Conversation 2; 11 = Post Conflict HR 1 Session 2; 12 = Post Conflict HR 2 Session 2

* *p* < .05 , ** *p* < .01, *** *p* < .001.

Table 5

Correlations Between Maternal Alcohol Craving during Conflict and Inclusion Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1	1											
2	.048	1										
3	.104	.060	1									
4	.010	.131	.413**	1								
5	.056	.078	-.062	-.010	1							
6	-.009	.039	-.003	-.136	.884***	1						
7	.135	.179	.053	-.111	-.158	-.135	1					
8	.016	-.068	-.085	.162	.151	.213	-.120	1				
9	-.117	-.125	-.351*	.008	.122	.153	.035	.574***	1			
10	.340*	.063	.252	.057	-.149	-.105	-.098	.158	.225	1		
11	-.070	.049	-.160	.174	.060	.088	-.038	.467**	.503***	.291	1	
12	-.151	.018	-.222	.174	.036	.047	-.057	.493***	.485**	.135	.944***	1

Note: N = 59. 1 = Offspring Gender; 2 = Offspring Age; 3 = MASQ Anxious Arousal; 4 =Parental Anxiety or Trauma Disorder; 5 = TLFB Monthly Average Number of Drinks per Week; 6 = TLFB Monthly Percent of Days Drinking; 7 = Baseline Alcohol Craving Conversation 1; 8 = Post Conflict Alcohol Craving 1 Session 1; 9 = Post Conflict Alcohol Craving 2 Session 1 ; 10 = Baseline Alcohol Craving Conversation 2; 11 = Post Conflict Alcohol Craving 1 Session 2; 12 = Post Conflict Alcohol Craving 2 Session 2

* *p* < .05 , ** *p* < .01, *** *p* < .001.

Table 6

Maternal Heart Rate as a Function of Experimental Condition

Fixed Effects		b	SE_b	95% CI	p
	Time	1.03	0.78	-0.47, 0.11	.190
	Quadratic Time	-0.18	0.15	-0.47, 2.53	.236
	Child Control Parent Training[1]	-5.60	3.99	-13.39, 2.19	.166
	Child Training Parent Control	3.58	3.99	-4.22, 11.38	.374
	Child Training Parent Training[2]	-3.23	4.07	-11.18, 4.71	.430
Variance Components					
	Intercept		10.03		
	Time		1.59		

Note. [1]Control condition coded as 1, therefore negative b estimates reflect lower mean heart rate and positive estimates reflect higher mean heart rate for experimental conditions than in the control condition.
[2] No higher order interactions between condition and time reached statistical significance, therefore they are not included in the current table

Table 7
Maternal Self-Reported Anxiety as a Function of Experimental Condition

Fixed Effects		b	SE_b	95% CI	p
	Time	1.76	2.45	-2.95, 6.46	.474
	Quadratic Time	1.87	0.73	0.46, 3.27	.011
	Child Control Parent Training[1]	1.63	6.63	-11.34, 14.61	.806
	Child Training Parent Control	0.82	6.65	-12.20, 13.84	.902
	Child Training Parent Training[2]	3.19	6.53	-9.60, 15.99	.627
Variance Components					
	Intercept	15.77			
	Time	4.77			
	Quadratic Time	1.97			

Note. [1]Control condition coded as 1, therefore negative b estimates for experimental conditions reflect lower mean self-reported anxiety and positive estimates reflect higher mean self-reported anxiety than in the control condition.
[2] No higher order interactions between condition and time reached statistical significance, therefore they are not included in the current table

Table 8

Maternal Self-Reported Arousal as a Function of Experimental Condition

Fixed Effects		b	SE_b	95% CI	p
	Time	0.22	0.23	-0.22, 0.66	.341
	Quadratic Time	-0.05	0.06	-0.17, 0.07	.407
	Child Control Parent Training[1]	-0.26	0.60	-1.45, 0.92	.663
	Child Training Parent Control	0.43	0.61	-0.75, 1.62	.472
	Child Training Parent Training[2]	-0.95	0.59	-1.22, 1.11	.931
Variance Components					
	Intercept	1.47			
	Time	0.62			
	Quadratic Time	0.18			

Note. [1]Control condition coded as 1, therefore negative b estimates for experimental conditions reflect lower mean self-reported arousal and positive estimates reflect higher mean self-reported arousal than in the control condition. Lower scores indicate higher levels of arousal.

[2] No higher order interactions between condition and time reached statistical significance, therefore they are not included in the current table

Table 9

Maternal Self Reported Alcohol Craving as a Function of Experimental Condition

Fixed Effects		b	SE_b	95% CI	p
	Time	3.82	1.98	0.03, 7.61	.054
	Quadratic Time	0.48	0.50	-0.48, 1.44	.340
	Child Control Parent Training[1]	0.81	3.55	-6.11, 7.73	.820
	Child Training Parent Control	1.71	3.63	-5.38, 8.81	.639
	Child Training Parent Training[2]	-0.69	3.55	-7.62, 6.23	.846
Variance Components					
	Intercept	6.03			
	Time	1.41			

Note. [1]Control condition coded as 1, therefore negative b estimates for experimental conditions reflect lower mean self reported craving and positive estimates reflect higher mean self reported craving than in the control condition.
[2] No higher order interactions between condition and time reached statistical significance, therefore they are not included in the current table
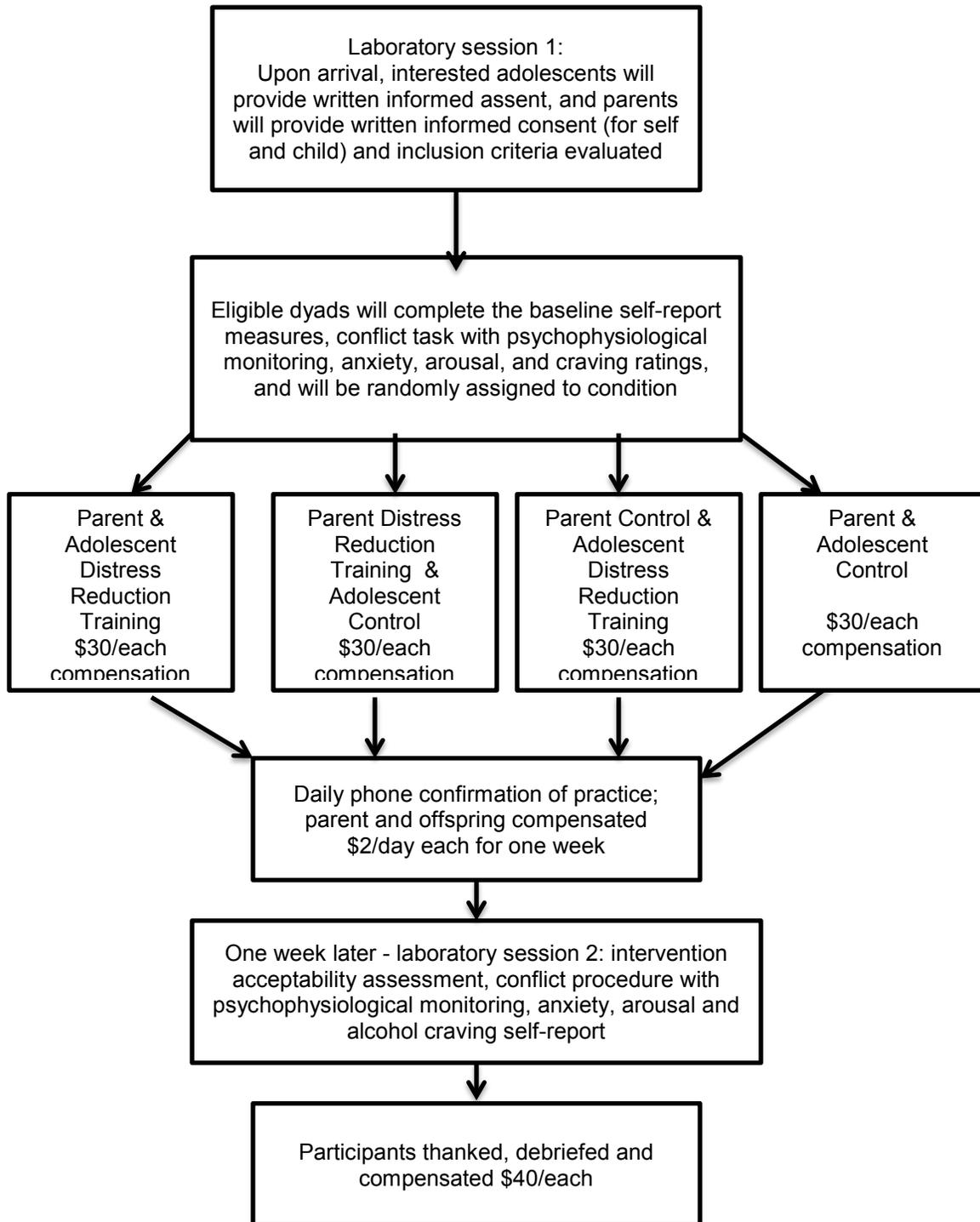
Figure 1. Visual illustration of procedures to be utilized with participants.
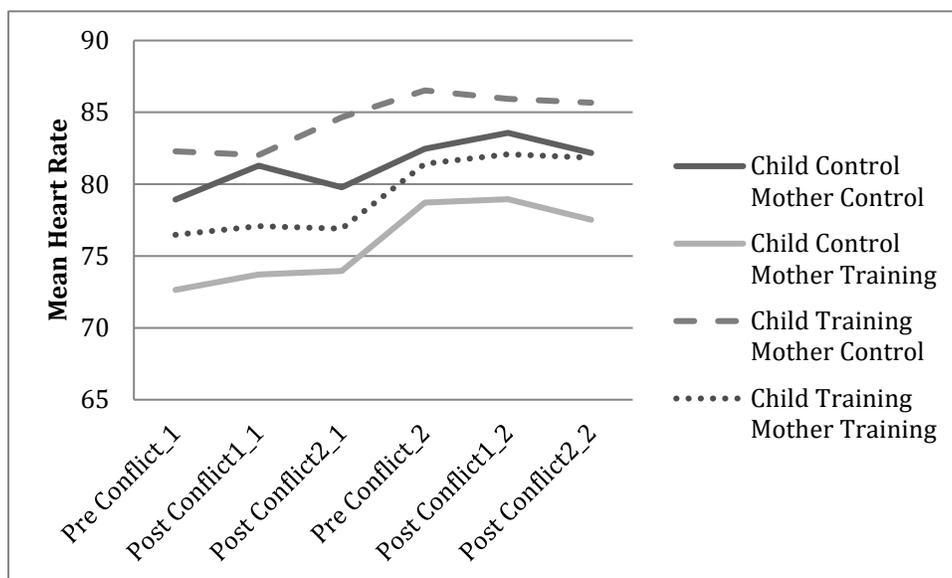
Figure 2. Changes in maternal heart rate across conflict tasks as a function of condition.

Note. PreConflict_1 = Baseline heart rate for first session; Post Conflict1_1 = heart rate during the first conflict task during session 1; PostConflict2_1= heart rate during the second conflict task during session 1; PreConflict_2 = Baseline heart rate for second session; Post Conflict1_2 = heart rate during the first conflict task during session 2; PostConflict2_2= heart rate during the second conflict task during session 2.
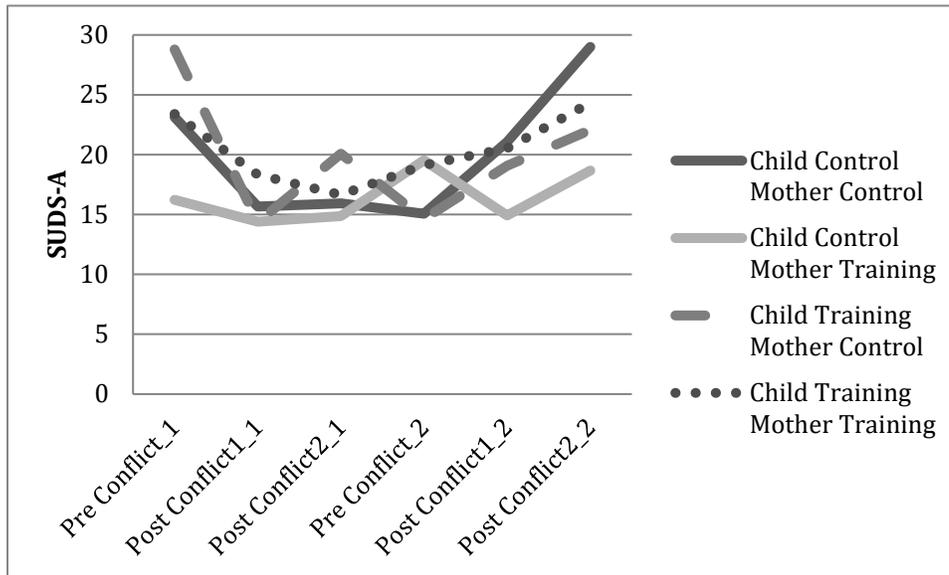
Figure 3. Changes in maternal self-reported anxiety across conflict tasks as a function of condition.

Note. PreConflict_1 = Baseline self reported anxiety for first session; Post Conflict1_1 = self reported anxiety after the first conflict task during session 1; PostConflict2_1= self reported anxiety after the second conflict task during session 1; . PreConflict_2 = Baseline self reported anxiety for second session; Post Conflict1_2 = self reported anxiety after the first conflict task during session 2; PostConflict2_2= self reported anxiety after the second conflict task during session 2.
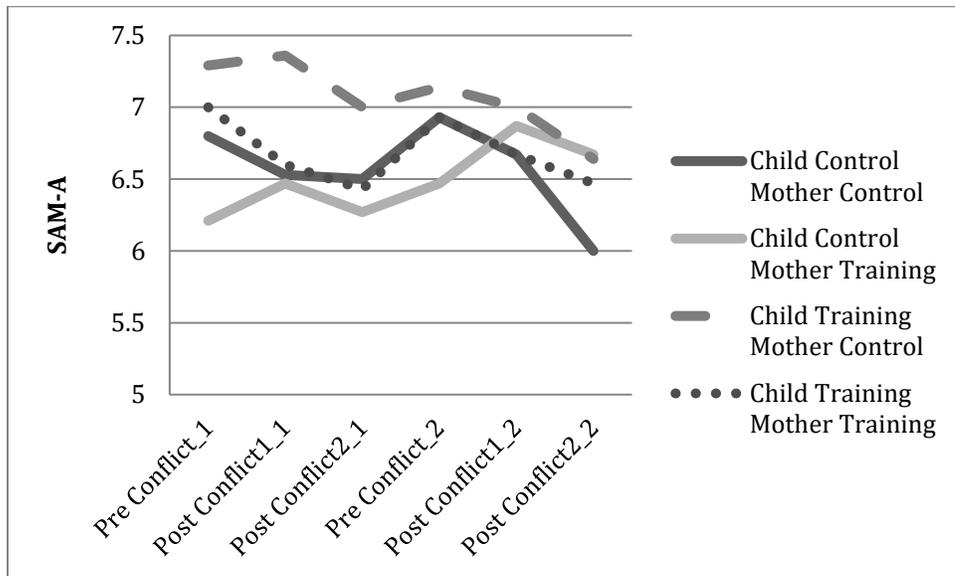
Figure 4. Changes in maternal self-reported arousal across conflict tasks as a function of condition.

Note. PreConflict_1 = Baseline self reported arousal for first session; Post Conflict1_1 = self reported arousal after the first conflict task during session 1; PostConflict2_1= self reported arousal after the second conflict task during session 1; . PreConflict_2 = Baseline self reported arousal for second session; Post Conflict1_2 = self reported arousal after the first conflict task during session 2; PostConflict2_2= self reported arousal after the second conflict task during session 2.
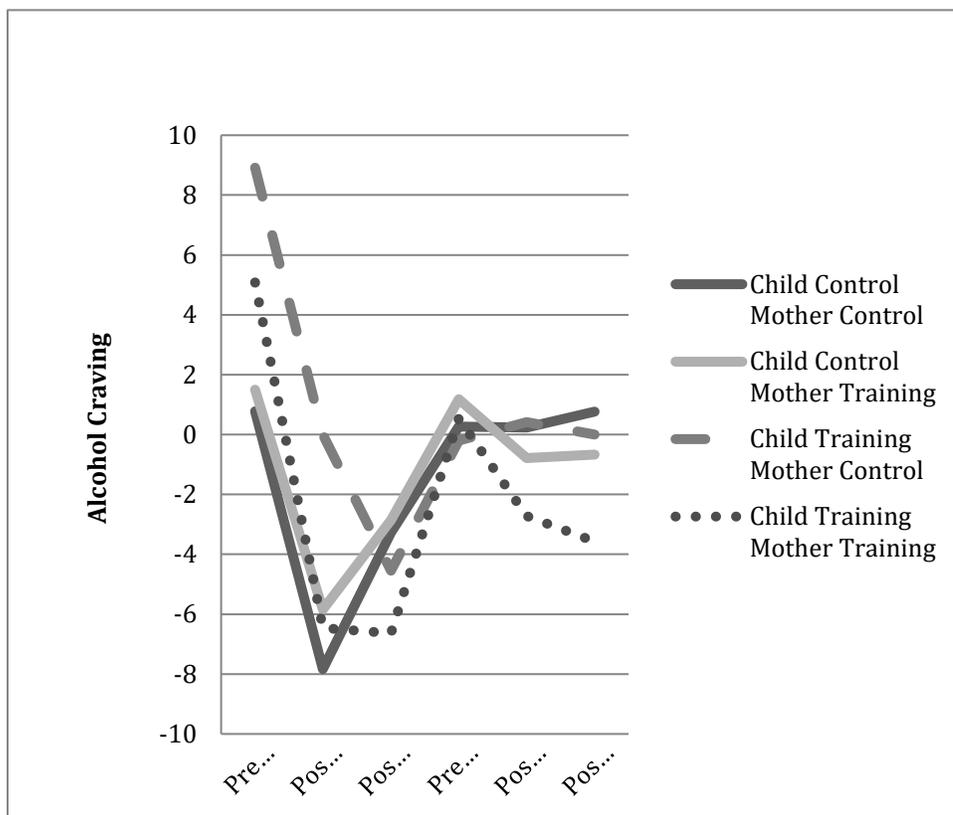
Figure 5. Changes in maternal self-reported alcohol craving across conflict tasks as a function of condition.

Note. PreConflict_1 = Baseline self reported alcohol craving for first session; Post Conflict1_1 = self reported alcohol craving after the first conflict task during session 1; PostConflict2_1= self reported alcohol craving after the second conflict task during session 1; PreConflict_2 = Baseline self reported alcohol craving for second session; Post Conflict1_2 = self reported alcohol craving after the first conflict task during session 2; PostConflict2_2= self reported alcohol craving after the second conflict task during session 2.

UNIVERSITY OF ARKANSAS

December 21, 2016

MEMORANDUM

TO: Sarah Bisky   Summer Webers
            Kristin Branson   Blaire Dinkmeyer
            Samantha Hansen   Enrique Salmanca
            Alyssa Swank   Teah Bynion
            Ellen Leen-Feldner

FROM: Ro Woodwalker
            IRB Coordinator

RE: New Protocol Approval

IRB Protocol #:   16-12-292

Protocol Title: *Parent Adolescent Conversation Emotion Study*

Review Type: ☐ EXEMPT   ☐ EXPEDITED   ☒ FULL IRB

Approved Project Period: Start Date: 12/20/2016 Expiration Date: 12/08/2017

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (https://vpred.uark.edu/units/rscp/index.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 245 participants. If you wish to make any modifications in the approved protocol, including enrolling more than this number, you must seek approval prior to implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

The IRB determined and documented that the risk is no greater than minimal and this protocol may be reviewed under expedited review procedure for future continuing reviews.

If you have questions or need any assistance from the IRB, please contact our of 109 MLKG Building, 5-2208, or irb@uark.edu.

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