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Toward Developing Laboratory-Based Parent-Adolescent Conflict Discussion Tasks that Consistently Elicit Adolescent Conflict-Related Stress Responses: Support from Physiology and Observed Behavior

Sarah A. Thomas,

Department of Psychiatry and Human Behavior, Alpert Medical School of Brown University, Providence, RI 02903

Tristan Wilson,

Comprehensive Assessment and Intervention Program, Department of Psychology, University of Maryland, College Park, MD 20742

Anjali Jain,

Comprehensive Assessment and Intervention Program, Department of Psychology, University of Maryland, College Park, MD 20742

Danielle E. Deros,

Comprehensive Assessment and Intervention Program, Department of Psychology, University of Maryland, College Park, MD 20742

Miji Um,

Comprehensive Assessment and Intervention Program, Department of Psychology, University of Maryland, College Park, MD 20742

Joanna Hurwitz,

Comprehensive Assessment and Intervention Program, Department of Psychology, University of Maryland, College Park, MD 20742

Irene Jacobs,

Comprehensive Assessment and Intervention Program, Department of Psychology, University of Maryland, College Park, MD 20742

Lindsay Myerberg,

Comprehensive Assessment and Intervention Program, Department of Psychology, University of Maryland, College Park, MD 20742

Katherine B. Ehrlich,

Department of Psychology, University of Georgia, Athens, GA 30602

Emily J. Dunn,

Department of Psychology, Ohio State University, Columbus, OH 43210

Correspondence regarding this manuscript should be addressed to Sarah A. Thomas, Department of Psychiatry and Human Behavior, Alpert Medical School, Brown University, Bradley Hospital, Laufer Administration Building, 1011 Veterans Memorial Parkway, East Providence, RI, US, 02915; sarah_thomas1@brown.edu.

Amelia Aldao,

Department of Psychology, Ohio State University, Columbus, OH 43210

Ryan Stadnik, and

University of Maryland, College Park, MD 20742

Andres De Los Reyes

Comprehensive Assessment and Intervention Program, Department of Psychology, University of Maryland, College Park, MD 20742

Abstract

Parent-adolescent conflict poses risk for youth maladjustment. One potential mechanism of this risk is that stress in the form of increased arousal during conflict interactions results in adolescents' impaired decision-making. However, eliciting consistent adolescent stress responses within laboratory-based tasks of parent-adolescent conflict (i.e., conflict discussion tasks) is hindered by task design. This limitation may stem from how conflict topics are assessed and selected for discussion. Within a sample of 47 adolescents (ages 14–17) and parents, we investigated whether a modified version of a conflict discussion task could elicit physiological (i.e., arousal) and behavioral (i.e., hostility) displays of adolescents' conflict-related stress responses. We assessed parent-adolescent conflict via structured interview to identify topics for dyads to discuss during the task. We randomly assigned dyads to complete a 5-minute task to discuss either a putatively benign topic (i.e., control condition) or a conflict topic while undergoing direct assessments of continuous arousal. Trained raters coded dyad members' hostile behavior during the task. Adolescents in the conflict condition exhibited significantly greater levels of arousal than adolescents in the control condition. We observed an interaction between discussion condition and baseline conflict. Specifically, higher baseline conflict predicted greater hostile behavior for adolescents in the conflict condition, yet we observed the inverse relation for adolescents in the control condition. Our modified laboratory discussion task successfully elicited both physiological and behavioral displays of adolescent conflict-related stress. These findings have important implications for leveraging experimental paradigms to understand causal links between parent-adolescent conflict and adolescent psychopathology, and their underlying mechanisms.

Keywords

adolescents; parent-adolescent conflict; hostility; psychophysiology; To(may)to-To(mah)to Interview

Introduction

Conflict between parents and adolescents occurs frequently in adolescence; yet high intensity conflict may be a transdiagnostic risk factor for adolescent maladjustment (Hollenstein & Loughheed, 2013). For example, conflict between parents and adolescents is significantly associated with adolescent depression, substance use disorders, anxiety, and attention/oppositional disorders (Chaplin et al., 2012; Edwards, Barkley, Laneri, Fletcher, & Metevia, 2001; Granger, Weisz, & Kauneckis, 1994; Granger, Weisz, McCracken, Ikeda, &

Douglas, 1996; Lewinsohn, Gotlib, & Seeley, 1995). Understanding characteristics and consequences of parent-adolescent conflict features prominently in developmental psychopathology research. Current work on these topics has progressed from presuming that all families are negatively affected by the “storm and stress” of adolescence, to recognizing that some family environments pose particular risk for maladaptive parent-adolescent conflict and adverse consequences for adolescents (e.g., Donenberg & Weisz, 1997; Hollenstein & Loughheed, 2013; Laursen & Collins, 1994; Rutter, Graham, Chadwick, & Yule, 1976). Although under some circumstances parent-adolescent conflict may be normative and even adaptive (Adams & Laursen, 2007; Laursen & Hafen, 2010), core features of maladaptive conflictual interactions may pose risk for youth maladjustment (e.g., Chaplin et al., 2014; Chaplin et al., 2012; Moed et al., 2015; Turpyn, Chaplin, Cook, & Martelli, 2015). Creating laboratory paradigms of parent-adolescent conflict discussions that approximate adolescents’ conflict-related responses is a first step towards then testing how this conflict impacts adolescent decision-making and behavior. Two factors that robustly relate to aversive conflict and maladjustment are adolescent psychophysiological arousal and behavioral activity linked to negative affect (e.g., hostility).

One important feature of maladaptive conflict interactions is that these situations may be perceived by adolescents as quite stressful (Jamieson & Mendes, 2016; Johnson, Dariotis, & Wang, 2012). A robust line of research, mainly in adults, underscores the negative impact of social stress on health and behavior (Kiecolt-Glaser, Fisher, Ogrocki, & Stout, 1987; Robles, Slatcher, Trombello, & McGinn, 2014). Specifically, stressful social interactions may reflect contexts of perceived threat, triggering the body’s “fight or flight” response (Bradley & Lang, 2007; Cannon, 1914). In these situations, the body triages the allocation of resources (Arnsten, 1999), resulting in increased sympathetic nervous system (SNS) responses (e.g., increased arousal as reflected by heart rate [HR]).

Understanding the nature of social stress—often measured with indices of psychophysiological, emotional, and behavioral arousal—in parent-adolescent conflict interactions has become a recent focus of the field due to its link with maladaptive youth outcomes (Chaplin et al., 2014; Chaplin et al., 2012; Crowell et al., 2013; Crowell et al., 2014; Moed et al., 2015; Van der Giessen et al., 2015). Psychophysiological stress during parent-adolescent conflict is frequently assessed via cardiovascular response. Heightened SNS response has been associated with parental invalidation behavior (Manczak, McLean, McAdams, & Chen, 2015) and threat-related emotional responses (Bradley & Lang, 2007; Thomas, Aldao, & De Los Reyes, 2012), including hostility (Diamond, 1982; Fredrickson et al., 2000; Virtanen et al., 2003) and adolescent substance use (Chaplin et al., 2012). An important, non-invasive step in determining the mechanism by which conflict predicts poor adolescent outcomes involves designing conflict task paradigms that induce cardiovascular stress responses.

Interpersonal conflict is a dyadic event in which the two individuals in the dyad have “incompatible behaviors or goals...expressed when one person overtly opposes another person’s actions or statements” (Shantz, 1987, p. 284). Thus, in addition to stress, behavioral opposition is an integral component of interpersonal conflict (Laursen & Collins, 1994). Consequently, direct observation of conflict comprises a core feature of “best practices” in

assessing and understanding conflict processes (see Donenberg & Weisz, 1997; Snyder, Heyman, & Haynes, 2005). Direct observation typically takes the form of controlled tasks meant to simulate conflict processes seen outside of the laboratory or clinic (e.g., conflict discussion tasks). To construct these tasks, researchers and clinicians collect subjective information about characteristics of a family's conflictual interactions (e.g., frequency and intensity, topics that produce conflict) using surveys or interviews (e.g., Laursen, 1995; Prinz, Foster, Kent, & O'Leary, 1979). To measure conflict response *in vivo* during these tasks, one might take psychophysiological readings as previously described (e.g., cardiovascular response; Chaplin et al., 2012; Crowell et al., 2014). In addition, one might measure observed behavior relevant to conflict processes (Chaplin et al., 2012; Ehrlich, Dykas, & Cassidy, 2012; Van der Giessen et al., 2015). Specifically, functional conflict resolution is characterized by constructive strategies such as validation, support, and listening, with neutral or positive affect exhibited (Laursen & Hafen, 2010). Dysfunctional styles include elements of coercion, low support, negative affect, criticism, and hostility (Chaplin et al., 2012; Laursen & Hafen, 2010). Dysfunctional conflict resolution styles evoke negative emotions for which their intensity and duration interfere with positive outcomes (e.g., successful problem-solving; Beauchaine, 2015; Moed et al., 2015) and pose risk for psychopathology (Crowell et al., 2013; Richmond, Mermelstein, & Wakschlag, 2013; Van der Giessen et al., 2015). Disagreement and hostility displayed within parent-adolescent conflict interactions predict negative outcomes in youth (Buehler, 2006; Laursen & Hafen, 2010; Van Doorn, Branje, & Meeus, 2008; Weymouth, Buehler, Zhou, & Henson, 2016). Thus, adolescent hostile behavior is a useful indicator of a maladaptive conflict management strategy linked to poor outcomes (Van Doorn et al., 2008; Weymouth et al., 2016). Overall, a proper controlled observation of parent-adolescent conflict should involve constructing a task that robustly elicits behavioral and physiological signs of such conflict.

With regard to eliciting conflict-related stress, elements considered integral in a laboratory task consistently eliciting a stress response include the unpredictability and uncontrollability of task activities, as well as the task activities involving social evaluation of task participants (Dickerson & Kemeny, 2004; Gunnar, Talge, & Herrera, 2009). Interestingly, it has been difficult to elicit a reliable stress response from adolescents participating in conflict discussion tasks (Gunnar et al., 2009), relative to adults (Kiecolt-Glaser et al., 1987). A key issue with conflict discussion tasks is the difficulty in constructing these tasks to be relevant to task participants. The surveys or interviews used to construct conflict discussion tasks typically consist of lists of common conflict topics, with parents and adolescents instructed to report on how often they "disagree" about these topics (e.g., Prinz et al., 1979). The process by which conflict topics are identified for laboratory discussion tasks is an important measurement consideration because the issues discussed determine the affective quality and intensity elicited (Beauchaine, 2015; Laursen & Hafen, 2010). First, the way conflict-related items are framed to informants (e.g., whether conflict means to fight *or* disagree) may be a key driver of item responses (see also Schwarz, 1999). Second, topics are often selected as the highest rated conflict mutual to both members of the dyad, or based on parent-report alone (i.e., either as first-choice or tie-breaker; Chaplin et al., 2012; Edwards et al., 2001; Granger et al., 1994). In turn, improving task design and methods by which to measure

indicators of conflict may thereby increase knowledge about the link between conflict and the development of psychopathology in youth.

In response to these concerns, we previously developed a structured interview (The To(may)to-To(mah)to Interview [TTI]; De Los Reyes et al., 2013a, b; De Los Reyes et al., 2012b) to assess parent-adolescent conflict. The TTI assesses topics that arise in daily life (e.g., chores, time spent with friends), which is crucial given everyday topics are linked with adolescent negative affect (Adams & Laursen, 2001). Further, the TTI frames responses to conflict topics with separate sections that assess *behavioral conflict* (arguing or fighting), as well as *differences in interpersonal perception* (holding different beliefs). Adolescents' and their parents' reports yield internally consistent estimates of both of these domains on the interview; reports on these domains also reflect related, yet distinct constructs (De Los Reyes et al., 2012b). In particular, both TTI domains differentially relate to adolescents' self-reports of delinquent behavior, and differ in their relation to performance-based tasks of interpersonal perception, thus indicating that these two domains tap related but disparate constructs (see De Los Reyes et al., 2013a, 2012b).

In addition to the difficulty constructing a conflict task, a second key issue with regard to the experimental study of parent-adolescent conflict involves identifying the contextual and individual difference factors that determine whether adolescents evidence a strong link between their experience of parent-adolescent conflict and psychosocial maladjustment (Hollenstein & Loughed, 2013; Laursen & Hafen, 2010; Rutter et al., 1976; Turpyn et al., 2015; Weymouth et al., 2016). Factors still unknown are under what conditions parent-adolescent conflict is expressed, and whether there are factors that may result in greater increases in the expression of behavioral conflict in adolescents, such as higher baseline conflict. In particular, the context of an interpersonal interaction (e.g., topic discussed) is often instrumental in eliciting adolescent conflict behavior (Adams & Laursen, 2001; Donenberg & Weisz, 1997; Laursen & Collins, 1994; Laursen & Hafen, 2010). To illustrate, results from previous laboratory-based studies of interpersonal conflict indicate that family members communicate in a more negative manner in stressful conditions (e.g., competitive, conflictual), relative to neutral or positive conditions (e.g., Barton, Alexander, & Turner, 1988). Thus, a comprehensive picture of maladaptive conflict processes may involve combined use of both contextual factors and individual differences (Donenberg & Weisz, 1997), such as those associated with increased arousal, that may elicit the type of negatively-valenced affect and behavior associated with poor outcomes in youth (e.g., baseline conflict).

The purpose of this study was to advance the literature on techniques for laboratory assessments of parent-adolescent conflict that focus on adolescent responses, in an effort to better understand adolescent maladjustment associated with conflict. Specifically, we leveraged the TTI and an experimental design to examine adolescents' physiology and behavior during a conflict discussion task. We addressed two aims. First, we assessed the effect of experimental assignment of parent-adolescent dyads to one of two discussion topics (i.e., TTI-identified conflict topic vs. control discussion topic) on adolescents' physiological arousal. Second, we tested whether this experimental assignment of a discussion topic produced differences across conditions in observed behavioral manifestations of conflict

(i.e., adolescent levels of hostility), and whether the size of this effect depends on baseline levels of perceived conflict outside of the laboratory. We used a well-established laboratory dyadic conflict paradigm (Donenberg & Weisz, 1997), and modified it based on (a) recommendations from prior work on components to include in tasks designed to elicit stress responses (i.e., unpredictability, uncontrollability, and social evaluative threat; see Dickerson & Kemeny, 2004; Gunnar et al., 2009), and (b) selection of adolescent-identified discussion topic. We hypothesized that adolescents in the conflict condition would evidence a significantly greater psychophysiological stress response than adolescents in the control condition. Further, because adolescents reporting greater dyadic baseline conflict may exhibit more conflictual interactions in laboratory, we hypothesized that the level of adolescent hostility expressed during the task would depend on both the discussion topic and adolescents' level of baseline conflict endorsed on the TTI. Our study builds on prior work in three ways: (1) inclusion of an experimental manipulation, (2) selection of an adolescent-identified conflict topic, and (3) a design meant to enable future study of proximal adolescent *effects* of parent-adolescent conflict, rather than the *process* of these discussions.

Method

Participants

Participants were 47 adolescents between the ages of 14–17, and their parent. We recruited dyads from an ongoing multiwave longitudinal study of an adolescent community sample (e.g., for recruitment details, please see Collado, Felton, MacPherson, & Lejuez, 2014) which focuses on the development of risk-taking in youths (“parent study”). At the time of recruitment, that sample was approximately 50% African American and 54% male. Participants were asked by research personnel affiliated with the parent study if they were interested in participating in the present study. Participants who expressed interest provided contact information for research personnel affiliated with the current study to contact them and describe study procedures. For interested participants, research personnel scheduled their study visit.

To be eligible for the present study, families had to speak English; understand the consent/assent process; have an adolescent living at home without a reported history of substantial developmental, learning, or psychotic disorders; and be available to attend an assessment with both parent and adolescent present. Fifty-one parent-adolescent dyads attended the study. One dyad was excluded during the study due to parent's acknowledgement that the youth did not meet the age criteria, despite previously endorsing the age as within the limit. A second dyad declined to consent to the study before participation but after randomization. Lastly, because two dyads declined video-taping during the consent process, their discussion behavior could not be coded and they were excluded entirely from analyses. This resulted in a final sample of 47 parent-adolescent dyads. Adolescents had been enrolled in the parent study for an average of 3.66 years ($SD = 2.52$; range 1–8). We report demographic characteristics of our sample divided by discussion condition in Table 1. Adolescents ranged in age from 14–17 years (24 females; M age = 14.98 [$SD = 1.03$]). Parents reported the adolescent's ethnicity/race as African American or Black (63.8%); White, Caucasian American, or European (38.3%); Hispanic or Latino/a (2.1%); or Asian American (2.1%).

Family ethnicity/race totals are above 100% because participants were able to select more than one ethnic/racial category. Adults were: 36 biological mothers (76.5%), 9 biological fathers (19.1%), one adoptive mother (2.1%), and one grandmother (2.1%). All caregivers reported completing at least a high-school education. According to parent-report, 19.2% of the families had a weekly household income of \$500 or less; 36.2% had a weekly income between \$501 and \$900; and 44.7% earned \$901 or more per week. The economic and racial background figures for our sample were consistent with the geographic area of our sampling range at the time of recruitment (U.S. Census Bureau, 2010).

Procedure

All procedures were approved by the IRB of the large Mid-Atlantic university at which the study was conducted. Once a family was identified for participation, study personnel explained via telephone the purpose and procedures of the study and answered all questions before scheduling a visit. At the start of their visit, families provided informed consent/assent after a thorough explanation by research staff. Video and audio recordings of assessments using Noldus Observer XT were taken for later behavioral coding. Parents and adolescents separately took part in a structured interview to assess dyadic conflict and identify conflict topics, and then each dyad was randomly assigned to complete together a 5-minute discussion task of either a TTI-identified conflict topic or a benign “control” topic (plan their dream vacation). Participants wore HR monitors throughout the study. Lastly, participants completed surveys, described below.

Physiological Recording—Throughout the tasks, we took peripheral measures of adolescents’ psychophysiology using ambulatory HR monitors (i.e., Polar Electro RS800CX), consistent with prior work in this age range (e.g., Anderson and Hope 2009; De Los Reyes and Aldao 2015; De Los Reyes et al. 2012a, 2015; Thomas et al. 2012). The equipment involved a watch worn on the wrist of the non-dominant hand, and an elastic band around their ribcage that is worn underneath their clothes. After the consent/assent process, adolescents met individually with a research assistant to learn how to apply the HR monitor and were provided with a secure changing area within the laboratory. The HR monitor recorded continuous inter-beat intervals (IBI), the time in milliseconds (ms) between consecutive heart beats, during a 5-minute baseline period and during the remainder of the study tasks.

Heart Rate—Because we were interested in psychophysiological arousal, we measured HR during a 5-minute baseline period during which adolescents sat in a chair in a room alone and were instructed to rest, as well as throughout the discussion task, as described below. The HR monitor produced a computer file of IBI values for each unit of time recorded, resulting in two files (i.e., baseline period and remaining task procedures). Using Polar ProTrainer 5 software, the computer files were segmented to reflect the time of the task for which we were interested in examining psychophysiological responses (e.g., baseline and discussion task). Next, these files were converted to text files and processed using a Python script to remove outliers and calculate IBI for 30-second segments. We identified outliers as IBI values less than 200 ms or greater than 1200 ms and replaced them with 200 ms or 1200 ms, respectively (e.g., De Los Reyes et al., 2012a, 2015). Using Microsoft Excel, the IBI

series was averaged for the respective task period, and then converted to HR using a formula (60,000 divided by IBI value to derive beats per minute [bpm]). Prior work indicates that these indices differentiate adolescents' levels of arousal between different periods of social stressor tasks and related interpersonal tasks (Anderson & Hope, 2009; De Los Reyes et al., 2017; De Los Reyes et al., 2015). During the baseline period, a research assistant entered the room to obtain saliva for a genetic sample for an unrelated project, and returned to collect it several minutes later. When processing and reviewing the data, we noticed an increase in HR that coincided with the presence of the staff member. Thus, we used a two-minute segment for the baseline time period when the adolescent was alone in the room and had acclimated to the task (60 seconds to 180 seconds) but before the saliva collection began.

Measures to Address Study Aims

We assessed five domains: (1) demographics, (2) adolescent psychophysiological arousal, (3) parent-adolescent conflict, and (4) parent-adolescent relationship characteristics.

Demographics—This parent-completed survey assessed demographics including age, gender, race/ethnicity, education level, marital and employment status, and household income.

Adolescent psychophysiological arousal—To assess whether the conflict condition elicited a greater stress response than the control condition, we measured adolescents' HR during the discussion task as an index of psychophysiological stress response. We computed the average adolescent HR in bpm during the 5-minute segments for both the conflict conditions and the vacation conditions, similar to other methods used in parent-adolescent conflict tasks (Chaplin et al., 2012; Granger et al., 1994). Due to technical difficulties, 6 adolescents' baseline data was missing, and 7 adolescents' discussion task data was missing, resulting in a final analytic sample of 41 for baseline condition comparisons, and 40 for task condition comparisons (see Table 2).

Parent-adolescent conflict topics—The To(may)to-To(mah)to Interview (TTI; De Los Reyes et al., 2012b; De Los Reyes & Suarez, 2009) reliably and validly assesses 1) behavioral conflict about daily life topics, and 2) parent and child perceptions of whether discrepancies exist between their beliefs about these topics. This structured interview included youth and parent versions that gather informants' reports of parent-child conflict and parent-child discrepant beliefs on 16 daily life topics (e.g., youth's computer time, spending time with the family; see De Los Reyes et al., 2013a for a complete list). Interviewers solicited informants' responses for items on scales ranging from "0" to "2" (Value labels represent the quantity "None", "Some" and "A lot", respectively). The scale labels were worded for their relevance to separate items for each topic that assess self-perceptions of the current status of topics (e.g., How often do you do your homework?), parent-child conflict (e.g., How often do you argue or fight with your caregiver about doing your homework?), and perceptions of whether parents and their children have different beliefs on how things should be (e.g., Do you think that you and caregiver have different beliefs about how often teens your age should do their homework?). Table 3 presents the means, standard deviations, and internal consistency estimates for adolescent behavioral

conflict and discrepant beliefs. Higher scores reflect greater amounts of the domain (i.e., behavioral conflict or discrepant beliefs). Coefficient alpha estimates demonstrated good internal consistency. Prior work supports the validity of the TTI as evidenced by relations between TTI scores and scores taken from survey and performance-based measures of family functioning and interpersonal perception (De Los Reyes et al., 2013a, b, 2012a).

Discussion task—Parents and adolescents engaged in a widely used 5-minute discussion task (Donenberg & Weisz, 1997; Gottman, 1979) to resolve the assigned topic. To address the factors previously mentioned as important in eliciting a stress response (i.e., unpredictability, uncontrollability, and social evaluation; Dickerson & Kemeny, 2004; Gunnar et al., 2009), we adapted the task in the following ways, respectively: a) families did not know when the discussion task would occur, b) families did not choose the discussion topic, and c) research personnel informed families that they would be observing them through a two-way mirror so they did not have to keep track of the time limit. In the between-subjects design, families in the control condition ($n = 22$; 46.8%) were randomly assigned the discussion topic of planning a vacation; families in the conflict condition ($n = 25$; 53.2%) were randomly assigned the discussion of a conflict topic, based on previously identified topics from the TTI. Topics selected with the highest frequency were “Doing your chores” (7 dyads) and “Spending time with the rest of the family” (3 dyads). At the conclusion of the TTI, for families randomized to the conflict condition, the discussion topic was chosen immediately from the adolescent’s TTI responses. Specifically, the topic selection was prioritized along a continuum according to the level and frequency of behavioral conflict present: that is, if there was a topic about which an adolescent reported s/he and the parent argue or fight “a lot of the time” (i.e., score of “2” on the “0-to-2” scale), that topic was selected for the discussion for that dyad. The least desirable topic to discuss was one in which the adolescent reported an absence of arguing/fighting or different beliefs. We prioritized topic selection this way because we expected topics about which adolescents report that they and their parents argue or fight to elicit the greatest adolescent stress response. Once the topic was identified, a research staff member introduced the topic to the parent and adolescent, elicited a brief description from each dyad member of how this topic arises between them, and then explained that they would like the parent and adolescent to come to a resolution on the details of the topic for 5 minutes. The research staff member left the room during the task and returned after the 5 minutes.

Coding of associated conflict behaviors—Two video cameras in the room were focused on the adolescent and the parent, respectively, resulting in two video files that enabled separate coding of parent and adolescent behavior. Research staff used observational methods to code conflict behaviors as an indicator of parent-adolescent conflict-related behavior. For this study, we focused on hostile behaviors to index negative interactions during the discussion task (e.g., Ehrlich et al., 2012). The Hostile Conflict Scale of the Conflict Task Coding System, a macro coding system, was used by four trained coders (Ziv, Cassidy, & Ramos-Marcuse, 2002). Behaviors were rated on a 7-point anchored scale (i.e., 1 to 7); higher scores indicate greater hostility. Behaviors coded as hostile include nonverbal behaviors (e.g., negative facial expressions, eye-rolling, slamming fist on table), as well as verbal behaviors (yelling, mocking, interrupting). High scores (e.g., 5 to 7) are reserved for

intense hostile behavior which includes character assassinations, globalizations (e.g., “you *never* care about what I say”), or persistently negative hostile interactions.

Four research assistants coded participant behaviors: One coder each was trained to code parent behavior or adolescent behavior, and two coders were trained to code both parent and adolescent behaviors. First, coders were trained to agreement on the behavioral coding system using archived videos from a similar laboratory task. All coders had to have average scores with less than 1-point difference from the “true” scores from the training videos before they could progress to the coding of the videos in the current project. From the current coding videos, approximately 40% of videos were randomly selected as reliability cases (i.e., assigned to two coders) to check that coders rated behaviors similarly. Coders were blind to which cases would be used for reliability prior to coding the videos. Weekly meetings were held where reliability cases were discussed and viewed. Coders provided justification for their ratings if they were discrepant from one another. For these reliability cases, the first author made the final decision on ratings when necessary (e.g., coders could not agree or it was clear both coders had not rated the behavior accurately). Final ratings for the reliability cases were the scores used in the statistical analyses for the aims of the study. For reliability cases, interrater reliability was calculated using intraclass correlation coefficients (ICCs) for “average measures” (Cicchetti, 1994; Shrout & Fleiss 1979). Means, standard deviation, and interrater reliability estimates are presented in Table 2. For adolescent hostility, the ICC was .39, which was quite low and unexpected. The average of both coders’ reliability ratings for adolescent hostility was 1.5; conducting a paired *t*-test between these coders’ ratings showed no significant differences between ratings, $p = 1.00$. One case had hostility ratings of 1 and 4, and by excluding that one case from the reliability analyses only, the ICC rose from .39 to .73, suggesting that the ICC was strongly influenced by one discrepant case. When running main analyses for hostility (see Hypothesis 2), results remained the same even when excluding this case; therefore, we retained this case in all analyses reported below. Lastly, one parent case was missing a discussion video due to equipment malfunction; therefore, we based any analysis including parent hostile behavior on data from 46 dyads.

Condition Differences on Baseline Parent-Adolescent Relationship Characteristics

The following surveys assessed for potential differences in our experimental discussion conditions in terms of baseline parent-adolescent relationship characteristics. See Table 4 for means, standard deviations, and reliability.

Parenting quality—To assess parenting behavior, we used two scales from the parent report of the Alabama Parenting Questionnaire (APQ; Frick, 1991): the Total Positive Parenting Score and Total Negative Parenting Score. Specifically, the Total Positive Parenting Score includes items such as “You let your child know when he/she is doing a good job with something”, and “You ask your child what his/her plans are for the coming day”. The Total Negative Parenting Score includes items such as “You threaten to punish your child and then do not actually punish him/her”, and “Your child stays out in the evening past the time he/she is supposed to be home.” Scores range from “1” to “5”, representing “Never” to “Always”, respectively, with higher scores indicating more of that domain (e.g.,

positive parenting). We excluded one item in the administration of the measure (“You/your parents hit you/your child with a belt, switch, or other object when you/he/she has/have done something wrong”) because of ethical and confidentiality concerns.

Adolescent disclosure—To assess relationship quality, we used the Adolescent Disclosure subscale (i.e., adolescent’s report) from a measure of parental monitoring completed by adolescents and parents (Kerr & Stattin, 2000). Adolescent Disclosure is the extent to which adolescents tell their parents about their activities and includes items such as “Do you talk at home with your caregiver about how you are doing in the different subjects in school” and “If you are out at night, when you get home, do you tell what you have done that evening?”. Scores range from “1” to “5”, representing a range of frequency such as “Most of the Time” to “Almost Never”. Two items in the Adolescent Disclosure Scale were reverse coded so that all items were scored in the same direction. Higher scores indicate greater adolescent disclosure. This scale longitudinally predicts parental knowledge of adolescents’ activities and changes in delinquency over time, such that as disclosure decreases, delinquency increases (Kerr, Stattin, & Burk, 2010).

Data Analysis

Overview—Data was analyzed using IBM SPSS, version 22. All hand-entered data (e.g., behavioral codes) were double-entered, compared, cleaned, and verified. Descriptive statistics were performed to check distributional assumptions and outliers. Parent and adolescent hostility violated the distributional assumptions (i.e., deviated from absolute values of approximately 1 for skewness and kurtosis). We used a square root transformation in analyses unless otherwise specified, such that after transformation, skewness and kurtosis were within acceptable ranges (see Table 2 note; Tabachnick & Fidell, 1996).

Composite variable—We were interested in testing whether greater TTI conflict was related to observed adolescent hostility during the discussion task. To reduce the risk for Type I error, we created a composite variable consisting of TTI argue/fight and different beliefs scores. First, we computed the correlation between these two scales, and found that the large-magnitude relation between them supported use of a composite score (adolescent: $r = .63, p < .001$; parent: $r = .56, p < .001$). To compute the composite score, we averaged the two scales together to create one score, which was then used in the moderation analyses. Scores ranged from 0.50 to 23.50, with higher scores indicating more reported conflict (see Table 3).

TTI Moderation—To test the extent to which randomization to the conflict condition affects adolescent conflict-related behavior, and whether the size of the effect depends on adolescents’ self-reported levels of conflict, we ran a regression analysis with adolescent hostile behavior as the dependent variable, discussion condition (vacation = 0; conflict = 1) as the predictor variable, and adolescent TTI composite score as the moderator, controlling for parent hostile behavior. We also ran the same analysis for parent variables, controlling for adolescent hostile behavior. We used the PROCESS macro (Hayes, 2013) in SPSS to conduct the regression analyses and the pick-a-point approach for a significant interaction effect, which tests the interaction at one standard deviation above and below the centered

mean of continuous moderators (Aiken & West, 1991). For ease of interpretation, the figure illustration of the probed interaction (Figure 1) is presented as non-centered, untransformed values, without controlling for parental hostile behavior. The figure illustrates the moderator at $\pm$ one standard deviation.

Dyadic Data Analysis—Lastly, our research question did not incorporate the dyadic nature of the discussion task because we were interested in the impact of conflict on adolescent behavior, but we wanted to ensure we accounted for dyadic interaction in the analysis. Thus, we ran an additional analysis using the Actor-Partner Interdependence Model (APIM; Kenny, Kashy, & Cook, 2006), in which the dyad was the unit of analysis, and parents and adolescents were nested within the dyad. Briefly, APIM analyses generate an actor effect (e.g., whether adolescents' own characteristics or reports impact their own outcome, controlling for partner effects), a partner effect (e.g., whether partner's characteristics or reports impact the actor's outcome, controlling for actor effects), and the ability to test the effect of the participant's role (parent or adolescent; Cook & Kenny, 2005; Kenny et al., 2006). Both adolescents' and parents' TTI composite score and hostile behaviors were included within a two-intercept model of distinguishable dyads that represent each dyad member's role (e.g., parent or adolescent). Analyses were conducted in SPSS using multi-level modeling.

Results

It was important first to establish that the participants, randomized to discussion conditions, did not differ on baseline characteristics to determine whether any effects of the discussion task were due solely to that task and not to systemic differences between groups. To compare the discussion conditions on demographics, psychophysiology, observed behavior, and parent-adolescent relationship quality, we conducted independent samples *t*-tests for continuous variables and chi-squared analyses for categorical variables. The demographics results are presented in Table 1, and the results for other variables are presented in Tables 2–4, all compared by discussion condition. The groups did not significantly differ on any baseline characteristics.

Additionally, we tested whether the control and conflict conditions differed on adolescent psychophysiology during the baseline period. Using independent samples *t*-tests, we compared adolescents randomized to the control condition (coded “0”) with those in the conflict condition (coded “1”) on mean baseline HR. Results for adolescent mean HR are presented in Table 2. Adolescents in the conflict condition did not significantly differ from adolescents in the control condition on mean HR during the 2-minute baseline period.

Adolescent Psychophysiological Stress Response

To assess whether adolescents randomized to the conflict condition exhibited a greater psychophysiological stress response than adolescents in the control condition, we conducted an independent samples *t*-test. During the discussion task, there were significant differences for mean HR, such that adolescents in the conflict condition exhibited significantly greater cardiovascular arousal than the adolescents in the control condition (see Table 2).

Interaction of Baseline Conflict and Discussion Condition Assignment on Hostility

To test the extent to which randomization to discussion condition affected observed adolescent hostility, and whether the size of this effect depends on adolescents' responses on the TTI, we conducted a moderation analysis using the PROCESS macro (Hayes, 2013). The dependent variable was hostile behavior, the predictor was discussion condition (0 = vacation condition; 1 = conflict condition), and the moderator was TTI composite score, controlling for parent hostility. Based on the analysis with centered variables, there was a significant interaction between discussion condition and TTI composite score, such that adolescents in the conflict condition with higher TTI composite scores exhibited greater hostility (Table 5). Post-hoc probing analyses indicated that the conditional effect of the interaction was significant ($p = .01$) for adolescents in the conflict condition with moderately high TTI composite scores ($B = 0.34$, $t[41] = 2.18$, $p = .03$), relative to adolescents with low TTI composite scores ($B = -0.25$, $t[41] = -1.60$, $p = .11$). The interaction effect (with $-1SD$ and $+1SD$) is illustrated in Figure 1, demonstrating that higher TTI composite scores were associated with greater hostile behavior for adolescents in the conflict condition. No main effects of discussion condition or TTI composite score on hostile behavior were present. The same analysis was run with parent variables, controlling for adolescent hostile behavior, with no significant findings. Similarly, the same analyses were run using TTI argue/fight and different beliefs instead of TTI composite scores, and the same general pattern of results already reported remained for parents and adolescents.

Actor Partner Interdependence Model Analysis

APIM analyses, conducted to confirm findings remained the same when accounting for the dyadic nature of the task, indicated that there was a significant actor effect of dyad role, such that adolescents, but not parents, exhibited a significant main effect of TTI Composite Score on observed hostility ($B = -0.05$, $t[40.94] = -2.09$, $p = .04$), with custom hypothesis testing indicating this effect is significantly different than parent's effect ($B = 0.07$, $t[58.10] = 2.09$, $p = .04$). Further, there was a significant adolescent-only interaction effect of TTI composite score for the relation between discussion condition and hostility behavior ($B = 0.07$, $t[40.94] = 2.39$, $p = .02$). In sum, our analyses including both dyad members' data indicated that only adolescents' was significant. These findings resulted in our decision to present the more parsimonious models for our main tests of Hypothesis 2 (see Table 5, Figure 1). For supplementary data for these analyses, please contact the corresponding author.

Discussion

In the current study, we sought to investigate the impact of parent-adolescent conflict on adolescents using a multi-method (psychophysiology, observed behavior, and structured interview) design, whereby we experimentally manipulated conflict. Specifically, we were interested in whether our experimental design resulted in increased physiological arousal for adolescents randomly assigned to the conflict discussion condition, and how discussion condition and baseline conflict were related to adolescent expressions of conflict-related behavior. Because increased arousal has a robust association with youth maladjustment (e.g., risky decisions, substance use; Chaplin et al., 2012; Figner, Mackinlay, Wilkening, & Weber,

2009; Heatherton & Wagner, 2011; Moed et al., 2015), we were especially interested in increased physiological arousal and expressions of negative affect (e.g., hostility).

Our study yielded several findings. First, random assignment of parent-adolescent dyads to a task in which they discussed either a TTI-identified conflict topic or a control topic elicited a significantly greater arousal response among adolescents assigned to the conflict topic, relative to the control topic. Second, the effect of the experimental manipulation of discussion condition on adolescent hostility behavior depended on TTI-assessed baseline conflict. Specifically, although baseline conflict did not differ across discussion groups in univariate analyses, the significant positive relation between assignment to the conflict condition and adolescent behavioral hostility was only significant for adolescents with high baseline conflict. Interestingly, this effect on hostile behavior was only true for adolescents, and not parents' own hostile behavior. In sum, the use of the modified laboratory discussion task, in conjunction with the TTI, appeared effective in evoking increased physiological and behavioral arousal in the conflict condition, relative to the control condition. These findings have several implications for the assessment of parent-adolescent conflict, discussed below.

Research and Theoretical Implications

Improving assessment methods—Given the broad, transdiagnostic implications of parent-adolescent conflict on adolescent maladjustment (Chaplin et al., 2012; Edwards et al., 2001; Granger et al., 1994; Granger et al., 1996; Lewinsohn et al., 1995), it is important to utilize methods that facilitate assessment of parent-adolescent conflict, with an emphasis on adolescent response, to identify mechanisms by which parent-adolescent conflict may be associated with adverse adolescent emotional and behavioral outcomes. Improving ecological validity by designing laboratory paradigms that approximate how typical conflictual parent-adolescent interactions occur in the “real-world” is integral to improving measurement of these factors. Our study design advances what is known about parent-adolescent conflict through use of an experimental design, emphasis on eliciting an adolescent stress response through selection of adolescent-relevant discussion topics, and a focus on adolescent outcome, rather than the family process of a conflict discussion. Consequently, the results of our study offer ways to modify the assessment of parent-adolescent conflict, discussed below, that may advance investigations of the robust link between parent-adolescent conflict and poor outcomes in youth.

Results from the current study suggest that baseline conflict, measured using the TTI, was instrumental in determining under what conditions and for whom expressions of increased behavioral arousal (adolescent hostility) occurred. Our results lend further support for using the TTI interview to assess topics on which adolescents and parents argue or fight, and/or have different beliefs (De Los Reyes et al., 2012b). Although we computed a composite score of these two domains (i.e., argue/fight, different beliefs) in the current analyses for more parsimonious models, it is possible that in other studies, these domains could be separate and would benefit from being treated as such. A recent meta-analysis found that the link between parent-adolescent conflict and negative youth outcomes did not differ according to conflict dimension (disagreement or hostility; Weymouth et al., 2016), providing support for our use of a composite score. Furthermore, our results indicate that to

elicit adolescent hostile behavior, it was not sufficient to simply randomize adolescent-parent dyads to a conflict discussion condition; rather, the link between discussion condition and hostility was only significant for adolescents with high baseline conflict scores in the conflict discussion condition. Neither main effect of discussion condition nor baseline conflict was significantly related to adolescent hostility behavior. These results suggest that when measuring parent-adolescent conflict, the context is important in eliciting expressions of adolescent hostility. In other words, providing measures or tasks of both state and trait conflict for dyads may result in improved identification of adolescents most likely to exhibit behavior related to negative affect. This may be because in doing so, both short-term (i.e., laboratory) and long-term (baseline) conflict characteristics are included and considered together, providing a more comprehensive view of the conflict. In turn, this may improve both assessment of correlates of parent-adolescent conflict, and lend support for future investigations into why certain parent-adolescent conflict is so robustly linked with youth maladjustment.

Increased arousal—Our modified task resulted in increased psychophysiological and behavioral arousal in the context of parent-adolescent conflict. Specifically, the experimental manipulation of conflict was sufficient to a) elicit greater HR in the conflict discussion condition, relative to the control discussion condition, and b) elicit greater observed adolescent hostility in adolescents with higher baseline conflict randomly assigned to the conflict discussion condition, despite non-significant between-condition differences in levels of baseline conflict. That our study elicited increased arousal is important for several reasons. First, a potential mechanism of the link between parent-adolescent conflict and youth maladjustment is stress, which reduces top-down regulatory control over emotional and behavioral response (Arnsten, 1999; Heatherton & Wagner, 2011; Liston, McEwen, & Casey, 2009; Qin, Hermans, van Marle, Luo, & Fernández, 2009), so our design should elicit expressions of increased arousal to determine whether it is associated with youth maladjustment in future investigations. Second, negative affect in parent-adolescent conflict (e.g., Adams & Laursen, 2001; Laursen, DeLay, Richmond, & Rubin, 2016) also has robust links to negative adolescent outcomes (Crowell et al., 2013; Richmond et al., 2013; Van der Giessen et al., 2015). Third, increased arousal is significantly associated with substance use (Chaplin et al., 2012). Therefore, studies assessing the role of parent-adolescent conflict on negative outcomes in youth may find it beneficial to include measurements of arousal as a manipulation check in their study. Lastly, it is important to note that although levels of hostility in the conflict condition were relatively low, even low levels of hostility pose risk for negative outcomes in adolescents (Buehler, 2006). This study was conducted in a community sample, and should be tested again in a sample of adolescents with psychopathology to compare levels of physiological and behavioral arousal.

Adolescent specificity—We chose to focus on adolescent indices in this study despite many other studies in this domain focusing on parenting behavior as a factor in adolescent psychopathology. This is because our primary objective was to understand how adolescents' own affect and behavior are related to contextual conflict and amount of baseline conflict because it is adolescents' own behavior that poses risk for future maladjustment. Second, relative to parents' reports, some data indicate that adolescents' reports of conflict evidence

stronger relations with adolescents' negative outcomes or maladjustment (De Los Reyes et al., 2012b; Weymouth et al., 2016). Results from our APIM analyses confirmed that it is only adolescents, and not caregivers, who exhibited increased hostility behavior in the conflict discussion condition when they also had higher baseline conflict. It is important to note that these results could be due to the fact that it was the adolescent TTI topic that was chosen, not the caregivers' TTI topic. However, that lends further support to our task design in that it is able to elicit increased arousal for some adolescents in the context of parent-adolescent conflict. Additionally, our use of multi-method adolescent assessment (e.g., structured interview, HR, behavioral ratings) also may help to rule out shared method variance in this circumstance as well.

Limitations

There are several limitations to the current investigation. First, although families were allowed to select which primary caregiver accompanied adolescents to the study, the majority of caregivers were biological mothers. Given that the TTI interview is conducted such that adolescents answer questions about the caregiver who accompanied them to the study, we are unable to determine whether these results would generalize to other caregivers in the home. For example, if a parent or caregiver who accompanied the adolescent to the study was not the caregiver with whom the adolescent experiences conflict, then this may not have simulated conditions of heightened social stress. A recent meta-analysis, however, suggests that findings do not vary significantly as a function of which parent is included in conflict studies (Weymouth et al., 2016), but future investigations would benefit from comparing results across caregivers.

Second, our investigation tested assessment methods related to one potential pathway that may explain the link between conflict and youth maladjustment (i.e., social stress); however, we recognize there may be several pathways by which these factors are related. Although we were interested in whether our experimental manipulation resulted in increased arousal, measured physiologically and behaviorally, given substantial research of the impact of social stress on wellbeing (Kiecolt-Glaser et al., 1987; Robles et al., 2014), evidence also suggests for some adolescents there may be a common genetic substrate that gives rise to the bidirectional relation between conflict and externalizing behaviors (Burt, McGue, Krueger, & Iacono, 2005).

Third, our investigation provided a global view of both psychophysiological and behavioral arousal, with one metric each of HR and hostility behavior during a 5-minute discussion task, which prevents some additional questions on this topic from being answered. For example, to better understand what aspects of conflict may be linked to maladjustment, sequential analyses of both parent and adolescent would be useful to map the time course of increased and decreased arousal on the discussion content and process. In the current investigation, we chose to focus on adolescents' physiology and behavior, given the robust risk parent-adolescent conflict poses for negative outcomes in youth (Dmitrieva, Chen, Greenberger, & Gil-Rivas, 2004; Duncan, Duncan, Biglan, & Ary, 1998; Klahr, Rueter, McGue, Iacono, & Burt, 2011; Van Doorn et al., 2008; Weymouth et al., 2016), yet understanding the sequence and timing of parent statements and adolescent response, and

vice versa, may potentially inform future interventions for strategies to reduce the negative impact of conflict. Finally, our small sample size prohibited us from testing whether results varied by other potential individual differences beyond baseline conflict, such as adolescent gender or racial and ethnic background.

The present study sought to investigate contextual, psychophysiological, and behavioral correlates of parent-adolescent conflict using an experimental design in a community sample. Randomizing dyads to either a control discussion task or conflict discussion task resulted in adolescents in the conflict discussion task exhibiting significantly greater HR than adolescents in the control discussion task. Additionally, we found that the strength of the relation between discussion condition and subsequent observed adolescent hostility was affected by level of baseline conflict. Specifically, random assignment to the conflict condition resulted in higher levels of hostility in adolescents who reported higher levels of conflict with their primary caregiver, despite no significant difference between discussion conditions on baseline conflict. In sum, we hope that results from this study offer guidance for researchers on how to design parent-adolescent conflict discussion tasks that may be able to measure the mechanism of the link between conflict and adolescent maladjustment by eliciting an adolescent stress response. Further, results support the idea that despite increases of general negative affect during adolescence (Somerville, Jones, & Casey, 2010), and of affective intensity of parent-adolescent conflict in particular (Laursen, Coy, & Collins, 1998), not all adolescents experience aversive conflict with their parents, and thus context (i.e., presence or absence of legitimately stressful topic, level of baseline conflict) matters in measuring this conflict (Donenberg & Weisz, 1997).

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References

- Adams R, Laursen B. The organization and dynamics of adolescent conflict with parents and friends. *Journal of Marriage and Family*. 2001; 63(1):97–110. DOI: 10.1111/j.1741-3737.2001.00097.x
- Adams R, Laursen B. The correlates of conflict: Disagreement is not necessarily detrimental. *Journal of Family Psychology*. 2007; 21(3):445–458. DOI: 10.1037/0893-3200.21.3.445 [PubMed: 17874930]
- Aiken, LS., West, SG. *Multiple regression: Testing and interpreting interactions*. Newbury Park: Sage; 1991.
- Anderson ER, Hope DA. The relationship among social phobia, objective and perceived physiological reactivity, and anxiety sensitivity in an adolescent population. *Journal of Anxiety Disorders*. 2009; 23(1):18–26. DOI: 10.1016/j.janxdis.2008.03.011 [PubMed: 18436426]
- Arnsten AFT. Development of the cerebral cortex: XIV. Stress impairs prefrontal cortical function. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1999; 38(2):220–222. DOI: 10.1097/00004583-199902000-00024 [PubMed: 9951224]
- Barton C, Alexander JF, Turner CW. Defensive communications in normal and delinquent families: The impact of context and family role. *Journal of Family Psychology*. 1988; 1(4):390–405. DOI: 10.1037/h0080468

- Beauchaine TP. Future directions in emotion dysregulation and youth psychopathology. *Journal of Clinical Child and Adolescent Psychology*. 2015; 44(5):875–896. DOI: 10.1080/15374416.2015.1038827 [PubMed: 26016727]
- Bradley, MM., Lang, PJ. Emotion and motivation. In: Cacioppo, JT, Tassinary, LG., Berntson, GG., editors. *Handbook of psychophysiology*. 3. New York, NY US: Cambridge University Press; 2007. p. 581–607.
- Buehler C. Parents and peers in relation to early adolescent problem behavior. *Journal of Marriage and Family*. 2006; 68(1):109–124. DOI: 10.1111/j.1741-3737.2006.00237.x
- Burt SA, McGue M, Krueger RF, Iacono WG. How are parent-child conflict and childhood externalizing symptoms related over time? Results from a genetically informative cross-lagged study. *Development and Psychopathology*. 2005; 17(1):145–165. DOI: 10.1017/S0954579405005008X [PubMed: 15971764]
- Cannon WB. The emergency function of the adrenal medulla in pain and the major emotions. *American Journal of Physiology*. 1914; 33(2):356–372.
- Chaplin TM, Hansen A, Simmons J, Mayes LC, Hommer RE, Crowley MJ. Parental-adolescent drug use discussions: Physiological responses and associated outcomes. *Journal of Adolescent Health*. 2014; 55(6):730–735. DOI: 10.1016/j.jadohealth.2014.05.001 [PubMed: 24957574]
- Chaplin TM, Sinha R, Simmons JA, Healy SM, Mayes LC, Hommer RE, Crowley MJ. Parent–adolescent conflict interactions and adolescent alcohol use. *Addictive Behaviors*. 2012; 37(5):605–612. DOI: 10.1016/j.addbeh.2012.01.004 [PubMed: 22341765]
- Cicchetti DV. Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment*. 1994; 6(4):284–290. DOI: 10.1037/1040-3590.6.4.284
- Collado A, Felton JW, MacPherson L, Lejuez CW. Longitudinal trajectories of sensation seeking, risk taking propensity, and impulsivity across early to middle adolescence. *Addictive Behaviors*. 2014; 39(11):1580–1588. DOI: 10.1016/j.addbeh.2014.01.024 [PubMed: 24566195]
- Cook WL, Kenny DA. The Actor-Partner Interdependence Model: A model of bidirectional effects in developmental studies. *International Journal of Behavioral Development*. 2005; 29(2):101–109. DOI: 10.1080/0165025044000405
- Crowell SE, Baucom BR, McCauley E, Potapova NV, Fitelson M, Barth H, ... Beauchaine TP. Mechanisms of contextual risk for adolescent self-injury: Invalidation and conflict escalation in mother-child interactions. *Journal of Clinical Child and Adolescent Psychology*. 2013; 42(4):467–480. DOI: 10.1080/15374416.2013.785360 [PubMed: 23581508]
- Crowell SE, Baucom BR, Yaptangco M, Bride D, Hsiao R, McCauley E, Beauchaine TP. Emotion dysregulation and dyadic conflict in depressed and typical adolescents: Evaluating concordance across psychophysiological and observational measures. *Biological Psychology*. 2014; 98:50–58. DOI: 10.1016/j.biopsycho.2014.02.009 [PubMed: 24607894]
- De Los Reyes A, Aldao A. Introduction to the special issue: Toward implementing physiological measures in clinical child and adolescent assessments. *Journal of Clinical Child and Adolescent Psychology*. 2015; 44:221–237. DOI: 10.1080/15374416.2014.891227 [PubMed: 25664767]
- De Los Reyes A, Aldao A, Qasmieh N, Dunn EJ, Lipton MF, Hartman C, ... Lerner MD. Graphical representations of adolescents' psychophysiological reactivity to social stressor tasks: Reliability and validity of the Chernoff Face approach and person-centered profiles for clinical use. *Psychological Assessment*. 2017; 29(4):422–434. DOI: 10.1037/pas0000354 [PubMed: 27427942]
- De Los Reyes A, Aldao A, Thomas SA, Daruwala S, Swan AJ, Van Wie M, ... Lechner WV. Adolescent self-reports of social anxiety: Can they disagree with objective psychophysiological measures and still be valid? *Journal of Psychopathology and Behavioral Assessment*. 2012a; 34(3):308–322. DOI: 10.1007/s10862-012-9289-2
- De Los Reyes A, Augenstein TM, Aldao A, Thomas SA, Daruwala S, Kline K, Regan T. Implementing psychophysiology in clinical assessments of adolescent social anxiety: use of rater judgments based on graphical representations of psychophysiology. *Journal of Clinical Child and Adolescent Psychology*. 2015; 44(2):264–279. DOI: 10.1080/15374416.2013.859080 [PubMed: 24320027]

- De Los Reyes A, Lerner MD, Thomas SA, Daruwala S, Goepel K. Discrepancies between parent and adolescent beliefs about daily life topics and performance on an emotion recognition task. *Journal of Abnormal Child Psychology*. 2013a; 41(6):971–982. DOI: 10.1007/s10802-013-9733-0 [PubMed: 23504303]
- De Los Reyes A, Salas S, Menzer MM, Daruwala SE. Criterion validity of interpreting scores from multi-informant statistical interactions as measures of informant discrepancies in psychological assessments of children and adolescents. *Psychological Assessment*. 2013b; 25(2):509–519. DOI: 10.1037/a0032081 [PubMed: 23544400]
- De Los Reyes, A., Suarez, L. Manual for the To(may)to-To(mah)to Interview-youth and caregiver versions. University of Maryland; College Park: 2009. Unpublished manuals
- De Los Reyes A, Thomas SA, Swan AJ, Ehrlich KB, Reynolds EK, Suarez L, ... Pabon SC. "It depends on what you mean by 'disagree'": Differences between parent and child perceptions of parent—Child conflict. *Journal of Psychopathology and Behavioral Assessment*. 2012b; 34(3): 293–307. DOI: 10.1007/s10862-012-9288-3 [PubMed: 25210227]
- Diamond EL. The role of anger and hostility in essential hypertension and coronary heart disease. *Psychological Bulletin*. 1982; 92(2):410–433. DOI: 10.1037//0033-2909.92.2.410 [PubMed: 7146235]
- Dickerson SS, Kemeny ME. Acute stressors and cortisol responses: A theoretical integration and synthesis of laboratory research. *Psychological Bulletin*. 2004; 130(3):355–391. DOI: 10.1037/0033-2909.130.3.355 [PubMed: 15122924]
- Dmitrieva J, Chen CS, Greenberger E, Gil-Rivas V. Family relationships and adolescent psychosocial outcomes: Converging findings from Eastern and Western cultures. *Journal of Research on Adolescence*. 2004; 14(4):425–447. DOI: 10.1111/j.1532-7795.2004.00081.x
- Donenberg GR, Weisz JR. Experimental task and speaker effects on parent-child interactions of aggressive and depressed/anxious children. *Journal of Abnormal Child Psychology*. 1997; 25(5): 367–387. DOI: 10.1023/A:1025733023979 [PubMed: 9421746]
- Duncan SC, Duncan TE, Biglan A, Ary D. Contributions of the social context to the development of adolescent substance use: A multivariate latent growth modeling approach. *Drug and Alcohol Dependence*. 1998; 50(1):57–71. DOI: 10.1016/s0376-8716(98)00006-4 [PubMed: 9589273]
- Edwards G, Barkley RA, Laneri M, Fletcher K, Metevia L. Parent-adolescent conflict in teenagers with ADHD and ODD. *Journal of Abnormal Child Psychology*. 2001; 29(6):557–572. DOI: 10.1023/a:1012285326937 [PubMed: 11761288]
- Ehrlich KB, Dykas MJ, Cassidy J. Tipping points in adolescent adjustment: Predicting social functioning from adolescents' conflict with parents and friends. *Journal of Family Psychology*. 2012; 26(5):776–783. DOI: 10.1037/a0029868 [PubMed: 22946461]
- Figner B, Mackinlay RJ, Wilkening F, Weber EU. Affective and deliberative processes in risky choice: Age differences in risk taking in the Columbia Card Task. *Journal of Experimental Psychology: Learning, Memory, and Cognition*. 2009; 35(3):709–730. DOI: 10.1037/a0014983
- Fredrickson BL, Maynard KE, Helms MJ, Haney TL, Siegler IC, Barefoot JC. Hostility predicts magnitude and duration of blood pressure response to anger. *Journal of Behavioral Medicine*. 2000; 23(3):229–243. DOI: 10.1023/a:1005596208324 [PubMed: 10863676]
- Frick, PJ. The Alabama Parenting Questionnaire. University of Alabama; 1991. Unpublished rating scale
- Gottman, JM. Marital interaction: Experimental investigations. New York: Academic Press; 1979.
- Granger DA, Weisz JR, Kauneckis D. Neuroendocrine reactivity, internalizing behavior problems, and control-related cognitions in clinic-referred children and adolescents. *Journal of Abnormal Psychology*. 1994; 103(2):267–276. DOI: 10.1037/0021-843x.103.2.267 [PubMed: 8040496]
- Granger DA, Weisz JR, McCracken JT, Ikeda SC, Douglas P. Reciprocal influences among adrenocortical activation, psychosocial processes, and the behavioral adjustment of clinic-referred children. *Child Development*. 1996; 67(6):3250–3262. DOI: 10.1111/j.1467-8624.1996.tb01912.x [PubMed: 9071780]
- Gunnar MR, Talge NM, Herrera A. Stressor paradigms in developmental studies: What does and does not work to produce mean increases in salivary cortisol. *Psychoneuroendocrinology*. 2009; 34(7): 953–967. DOI: 10.1016/j.psyneuen.2009.02.010 [PubMed: 19321267]

- Hayes, AF. Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. New York, NY, US: Guilford Press; 2013.
- Heatherton TF, Wagner DD. Cognitive neuroscience of self-regulation failure. *Trends in Cognitive Sciences*. 2011; 15(3):132–139. DOI: 10.1016/j.tics.2010.12.005 [PubMed: 21273114]
- Hollenstein T, Loughheed JP. Beyond storm and stress: Typicality, transactions, timing, and temperament to account for adolescent change. *American Psychologist*. 2013; 68(6):444–454. DOI: 10.1037/a0033586 [PubMed: 23915399]
- Jamieson JP, Mendes WB. Social stress facilitates risk in youths. *Journal of Experimental Psychology-General*. 2016; 145(4):467–485. DOI: 10.1037/xge0000147 [PubMed: 26866533]
- Johnson SB, Dariotis JK, Wang C. Adolescent risk taking under stressed and nonstressed conditions: Conservative, calculating, and impulsive types. *Journal of Adolescent Health*. 2012; 51(2):S34–S40. DOI: 10.1016/j.jadohealth.2012.04.021 [PubMed: 22794532]
- Kenny, DA., Kashy, DA., Cook, WL. Dyadic data analysis. New York, NY: Guilford Press; 2006.
- Kerr M, Stattin H. What parents know, how they know it, and several forms of adolescent adjustment: Further support for a reinterpretation of monitoring. *Developmental Psychology*. 2000; 36(3):366–380. DOI: 10.1037/0012-1649.36.3.366 [PubMed: 10830980]
- Kerr M, Stattin H, Burk WJ. A reinterpretation of parental monitoring in longitudinal perspective. *Journal of Research on Adolescence*. 2010; 20(1):39–64. DOI: 10.1111/j.1532-7795.2009.00623.x
- Kiecolt-Glaser JK, Fisher LD, Ogrocki P, Stout JC, Speicher CE, Glaser R. Marital quality, marital disruption, and immune function. *Psychosomatic Medicine*. 1987; 49(1):13–34. [PubMed: 3029796]
- Klahr AM, Rueter MA, McGue M, Iacono WG, Burt AS. The relationship between parent-child conflict and adolescent antisocial behavior: Confirming shared environmental mediation. *Journal of Abnormal Child Psychology*. 2011; 39(5):683–694. DOI: 10.1007/s10802-011-9505-7 [PubMed: 21484334]
- Laursen B. Conflict and social interaction in adolescent relationships. *Journal of Research on Adolescence*. 1995; 5(1):55–70. DOI: 10.1207/s15327795jra0501_3
- Laursen B, Collins WA. Interpersonal conflict during adolescence. *Psychological Bulletin*. 1994; 115(2):197–209. DOI: 10.1037//0033-2909.115.2.197 [PubMed: 8165270]
- Laursen B, Coy KC, Collins WA. Reconsidering changes in parent-child conflict across adolescence: A meta-analysis. *Child Development*. 1998; 69(3):817–832. DOI: 10.1111/j.1467-8624.1998.00817.x [PubMed: 9680687]
- Laursen B, DeLay D, Richmond A, Rubin KH. Youth negative affect attenuates associations between compromise and mother-adolescent conflict outcomes. *Journal of Child and Family Studies*. 2016; 25(4):1110–1118. DOI: 10.1007/s10826-015-0288-2 [PubMed: 27041977]
- Laursen B, Hafen CA. Future directions in the study of close relationships: Conflict is bad (except when it's not). *Social Development*. 2010; 19(4):858–872. DOI: 10.1111/j.1467-9507.2009.00546.x [PubMed: 20953335]
- Lewinsohn PM, Gotlib IH, Seeley JR. Adolescent psychopathology: IV. Specificity of psychosocial risk factors for depression and substance abuse in older adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1995; 34(9):1221–1229. DOI: 10.1097/00004583-199509000-00021 [PubMed: 7559318]
- Liston C, McEwen BS, Casey BJ. Psychosocial stress reversibly disrupts prefrontal processing and attentional control. *Proceedings of the National Academy of Sciences of the United States of America*. 2009; 106(3):912–917. DOI: 10.1073/pnas.0807041106 [PubMed: 19139412]
- Manczak EM, McLean KC, McAdams DP, Chen E. Physiological reactivity during parent-adolescent discussions: Associations with scaffolding behaviors and relationship quality. *Annals of Behavioral Medicine*. 2015; 49(4):522–531. DOI: 10.1007/s12160-014-9680-1 [PubMed: 25582990]
- Moed A, Gershoff ET, Eisenberg N, Hofer C, Losoya S, Spinrad TL, Liew J. Parent-adolescent conflict as sequences of reciprocal negative emotion: Links with conflict resolution and adolescents' behavior problems. *Journal of Youth and Adolescence*. 2015; 44(8):1607–1622. DOI: 10.1007/s10964-014-0209-5 [PubMed: 25358960]

- Prinz RJ, Foster SL, Kent RN, O'Leary KD. Multivariate assessment of conflict in distressed and nondistressed mother–adolescent dyads. *Journal of Applied Behavior Analysis*. 1979; 12(4):691–700. DOI: 10.1901/jaba.1979.12-691 [PubMed: 541311]
- Qin S, Hermans EJ, van Marle HJF, Luo J, Fernández G. Acute psychological stress reduces working memory-related activity in the dorsolateral prefrontal cortex. *Biological Psychiatry*. 2009; 66(1): 25–32. DOI: 10.1016/j.biopsych.2009.03.006 [PubMed: 19403118]
- Richmond MJ, Mermelstein RJ, Wakschlag LS. Direct observations of parenting and real-time negative affect among adolescent smokers and nonsmokers. *Journal of Clinical Child and Adolescent Psychology*. 2013; 42(5):617–628. DOI: 10.1080/15374416.2012.738452 [PubMed: 23153193]
- Robles TF, Slatcher RB, Trombello JM, McGinn MM. Marital quality and health: A meta-analytic review. *Psychological Bulletin*. 2014; 140(1):140–187. DOI: 10.1037/a0031859 [PubMed: 23527470]
- Rutter M, Graham P, Chadwick OF, Yule W. Adolescent turmoil: Fact or fiction? *Journal of Child Psychology and Psychiatry*. 1976; 17(1):35–56. DOI: 10.1111/j.1469-7610.1976.tb00372.x [PubMed: 1249139]
- Schwarz N. Self-reports: How the questions shape the answers. *American Psychologist*. 1999; 54(2): 93–105. DOI: 10.1037//0003-066x.54.2.93
- Shantz CU. Conflicts between children. *Child Development*. 1987; 58(2):283–305. DOI: 10.1111/j.1467-8624.1987.tb01378.x
- Shrout PE, Fleiss JL. Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin*. 1979; 86(2):420–428. DOI: 10.1037/0033-2909.86.2.420 [PubMed: 18839484]
- Snyder DK, Heyman RE, Haynes SN. Evidence-based approaches to assessing couple distress. *Psychological Assessment*. 2005; 17(3):288–307. DOI: 10.1037/1040-3590.17.3.288 [PubMed: 16262455]
- Somerville LH, Jones RM, Casey BJ. A time of change: Behavioral and neural correlates of adolescent sensitivity to appetitive and aversive environmental cues. *Brain and Cognition*. 2010; 72(1):124–133. DOI: 10.1016/j.bandc.2009.07.003 [PubMed: 19695759]
- Tabachnick, BG., Fidell, LS. *Using multivariate statistics*. 3. New York, NY: HarperCollins Publishers; 1996.
- Thomas SA, Aldao A, De Los Reyes A. Implementing clinically feasible psychophysiological measures in evidence-based assessments of adolescent social anxiety. *Professional Psychology-Research and Practice*. 2012; 43(5):510–519. DOI: 10.1037/a0029183
- Turpyn CC, Chaplin TM, Cook EC, Martelli AM. A person-centered approach to adolescent emotion regulation: Associations with psychopathology and parenting. *Journal of Experimental Child Psychology*. 2015; 136:1–16. DOI: 10.1016/j.jecp.2015.02.009 [PubMed: 25846016]
- U.S. Census Bureau. State and county quickfacts. Washington, DC: 2010. Retrieved January 16, 2017, from <http://www.census.gov/quickfacts/table/PST045216/00>
- Van der Giessen D, Hollenstein T, Hale WW, Koot HM, Meeus W, Branje S. Emotional variability in mother-adolescent conflict interactions and internalizing problems of mothers and adolescents: Dyadic and individual processes. *Journal of Abnormal Child Psychology*. 2015; 43(2):339–353. DOI: 10.1007/s10802-014-9910-9 [PubMed: 25070359]
- Van Doorn MD, Branje SJT, Meeus WHJ. Conflict resolution in parent-adolescent relationships and adolescent delinquency. *The Journal of Early Adolescence*. 2008; 28(4):503–527. DOI: 10.1177/0272431608317608
- Virtanen R, Jula A, Salminen JK, Voipio-Pulkki LM, Helenius H, Kuusela T, Airaksinen J. Anxiety and hostility are associated with reduced baroreflex sensitivity and increased beat-to-beat blood pressure variability. *Psychosomatic Medicine*. 2003; 65(5):751–756. DOI: 10.1097/01.psy.0000088760.65046.cf [PubMed: 14508016]
- Weymouth BB, Buehler C, Zhou N, Henson RA. A meta-analysis of parent-adolescent conflict: Disagreement, hostility, and youth maladjustment. *Journal of Family Theory & Review*. 2016; 8(1):95–112. DOI: 10.1111/jftr.12126
- Ziv, Y., Cassidy, J., Ramos-Marcuse, F. *The conflict task coding system*. University of Maryland; College Park, Maryland: 2002. Unpublished manuscript

Fig. 1.

Adolescent TTI Composite Scores moderate the relation between discussion condition and adolescent hostility behavior. Post-hoc probing analyses indicated that greater TTI composite scores were significantly associated with greater hostility behavior for adolescents in the conflict discussion condition (see Table 5). Untransformed Hostility and uncentered predictor variables.

Table 1

Comparison of Baseline Demographic Characteristics Between Discussion Conditions

Demographic Characteristic	Vacation (<i>n</i> = 22)			Conflict (<i>n</i> = 25)			<i>p</i>
	<i>M</i>	<i>SD</i>	#	<i>M</i>	<i>SD</i>	#	
Age	14.86	1.03		15.08	1.03		.48
Adolescent Gender (% female)			12			12	.65
							.15
Ethnicity							
African American or Black			17			13	52.0
Asian American or Asian						1	4.0
Hispanic or Latino/a (Spanish)			1				NA
White, Caucasian American, or European			6			12	48.0
Parent Marital Status							.84
Never married			5			6	24.0
Married/living together			13			14	56.0
Separated/divorced			4			5	20.0
Family Weekly Earnings							.15
\$500 or less			6			3	12.0
\$501 and \$900			5			12	48.0
\$901 or more per week			11			10	40.0

Table 2

Means (M), Standard Deviations (SD), and Reliability Estimates of Psychophysiology, Discussion Task Observed Behavior, and Comparison Between Discussion Conditions

Variable	M	SD	ICC	t-Test	p	d
Adolescent Baseline HR (<i>n</i> = 41)	76.71	12.53		-1.77	.08	
Vacation Condition (<i>n</i> = 19)	73.08	10.61				
Conflict Condition (<i>n</i> = 22)	79.85	13.43				
Adolescent Discussion HR (<i>n</i> = 40)	76.17	10.92		-2.29	.03	0.74
Vacation Condition (<i>n</i> = 19)	72.22	9.82				
Conflict Condition (<i>n</i> = 21)	79.74	10.85				
Adolescent Hostility and Rejection	1.93	1.43	.39	-0.74	.46	
Vacation Condition (<i>n</i> = 22)	1.72	0.98				
Conflict Condition (<i>n</i> = 25)	2.12	1.74				
Parent Hostility and Rejection	2.30	1.68	.98	-0.52	.60	
Vacation Condition (<i>n</i> = 22)	2.13	1.39				
Conflict Condition (<i>n</i> = 24)	2.46	1.93				

Note. Hostility variables violated distributional assumptions. A square root transformation was applied to adolescent hostility (transformed *M* = 1.32, *SD* = 0.43; vacation: *M* = 1.27, *SD* = 0.33; conflict: *M* = 1.37, *SD* = 0.51) and parent hostility (transformed *M* = 1.43, *SD* = 0.50; vacation: *M* = 1.39, *SD* = 0.44; conflict: *M* = 1.47, *SD* = 0.55). Means and standard deviations displayed in the table are untransformed. *t*-tests were conducted with transformed variables.

HR = heart rate in beats per minute. ICC = intraclass correlation coefficient.

Table 3

Means (M), Standard Deviations (SD), and Internal Consistency (α) Estimates of Survey Measures of TTI, and Comparison Between Vacation Condition (n = 22) and Conflict Condition (n = 25).

Variable	M	SD	α	t-Test	p
Adolescent TTI Argue/Fight Total	6.21	3.75	.73	1.04	.30
Vacation Condition	6.82	3.70			
Conflict Condition	5.68	3.79			
Adolescent TTI Different Beliefs Total	8.34	5.36	.79	1.52	.13
Vacation Condition	9.59	5.33			
Conflict Condition	7.24	5.24			
Adolescent TTI Composite Score	7.27	4.12		1.46	.15
Vacation Condition	8.20	4.01			
Conflict Condition	6.46	4.13			
Parent TTI Argue/Fight Total	7.15	4.55	.81	-0.14	.88
Vacation Condition	7.04	3.92			
Conflict Condition	7.24	5.11			
Parent TTI Different Beliefs Total	11.19	6.95	.86	0.07	.94
Vacation Condition	11.27	6.16			
Conflict Condition	11.12	7.71			
Parent TTI Composite Score	9.17	5.11		-0.01	.99
Vacation Condition	9.16	4.05			
Conflict Condition	9.18	5.98			

Note. TTI = To(may)to-To(mah)to Interview.

Table 4

Means (M), Standard Deviations (SD), and Internal Consistency (α) Estimates of Parent-adolescent Relationship Characteristics, and Comparison Between Vacation Condition (n = 22) and Conflict Condition (n = 25).

Variable	M	SD	α	t-Test	p
Parent APQ Positive Parenting	61.89	7.25	.83	-0.62	.53
Vacation Condition	61.18	8.17			
Conflict Condition	62.52	6.45			
Parent APQ Negative Parenting	35.08	7.13	.75	0.41	.68
Vacation Condition	35.54	6.03			
Conflict Condition	34.68	8.08			
Adolescent Disclosure	10.19	3.55	.78	-1.00	.32
Vacation Condition	9.63	3.12			
Conflict Condition	10.68	3.88			

Note. APQ = Alabama Parenting Questionnaire.

Hierarchical Linear Regression Analyses Summary for Hostility, Discussion Condition, and Adolescent-reported Conflict (TTI Composite Score [N = 46])

Variable	B	SeB	R ²	R ²	p
Step 1			0.39 *		.00
Discussion Condition	0.04	0.11			.66
TTI composite Score [Adolescent]	−0.01	0.01			.43
Step 2				0.10 *	.01
Discussion condition X TTI Composite Score	0.07 *	0.02			.01
Step 1			0.29 *		.00
Discussion Condition	0.01	0.13			.90
TTI Composite Score [Parent]	0.01	0.01			.23
Step 2				0.00	.83
Discussion condition X TTI Composite Score	0.00	0.03			.83

Note. B = Unstandardized beta; SeB = Standard error; Discussion Condition is coded Vacation = “0” and Conflict = “1”. Predictors are square-root transformed hostility and centered variables. Top: adolescent scores, controlling for parental hostility. Bottom: parent scores, controlling for adolescent hostility.

TTI = To(may)to-To(mah)to Interview.

* p < .05.