ORGANIZATIONAL, CONTEXTUAL, AND AUTONOMIC CORRELATES OF VERBALIZED MOTHER-ADOLESCENT CONFLICT: AN EXPLORATIVE STUDY

by

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Abstract

Although there have been consistent findings that moderate levels of family conflict are normative during adolescence (Laursen & Collins, 2004; Montemayor, 1983; Rutter, Graham, Chadwick, and Yule, 1976), the majority of work has focused on frequency and intensity of conflict, largely ignoring other contextual factors that may account for the variance in parent-adolescent verbal conflicts. Additionally, extant research has not examined both parent and adolescent autonomic responding during conflict. The purpose of this study is to address these gaps in knowledge regarding parent-adolescent conflict. A sample of 40 mother-adolescent dyads participated in a revealed differences task to attempt to resolve an area of disagreement. Context-specific features of parent-adolescent verbal conflict were examined in two ways. First, verbal and non-verbal expressions were coded for content and valence following procedures set out by The Oregon Social Learning Center (1998). Second, following the tradition of sociolinguistics, conversational styles (interruptions, turn-taking violations, listening) were assessed following procedures described by Beaumont (1993). Psychophysiological measures (respiratory sinus arrhythmia, cardiac pre-ejection period, electrodermal responding) were continuously recorded for both parent and adolescent for the entirety of the discussion. Results indicated that mothers tended to use positive and neutral content and valence whereas adolescents used negative valence and aversive interactions. In terms of conversational styles, adolescents utilized each of the conversational speech acts more than mothers and tended to perseverate in use of interruptive speech behaviours. However, mothers were shown to utilize a high-considerateness style (i.e., few turn-taking interruptions) to facilitate adolescent conversational involvement. Measures of physiological responding revealed associations with content, valence, and conversational speech acts; positive and neutral aspects of conversation corresponded with parasympathetic responding and negative conversational aspects

corresponded with sympathetic arousal. Together, these findings illustrate what contextual features may comprise a moderate level of conflict and provide further insight into the overall processes of parent-adolescent conflict. Implications of these findings for future directions in research on parent-adolescent conflict are discussed.

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Introduction

Parent-adolescent conflict has been researched extensively (Barber, 1994; Collins & Laursen, 2004; Eisenberg et al., 2008; Laursen & Collins, 1994, 2004; Montemayor, 1986; Smetana, 1988, 1989, 1996; Steinberg, 1981). Early psychoanalytic theorists (e.g. Erikson, 1968; Freud, 1958) believed that adolescence was a time of storm and stress and high levels of conflict and defiance were a normative course of adolescent development. Current research, however, has proven this to be largely untrue. Although a minority of families do experience high levels of turmoil, most families experience only moderate levels of conflict (Montemayor, 1983; Rutter, Graham, Chadwick, and Yule, 1976). Conflict is a normative aspect of all close relationships, but especially between family members because of the numerous interactions occurring each day (Laursen & Collins, 2004). As children enter adolescence, conflicts with their parents tend to become less frequent but increase in affective intensity (Laursen & Collins, 1994; Laursen, Coy, & Collins, 1998).

Within the abundance of literature documenting parent-adolescent conflict, most focuses on the frequency and intensity of parent-adolescent conflict (Barber, 1994; Montemayor, 1986). Although conflict is certainly affect-laden, much of the extant research has honed in on the negative components of parent-adolescent disagreements and the possible negative outcomes that may arise from chronic levels of conflict (Laursen & Collins, 1994, 2004; Smetana, 1996). This is problematic for two reasons. First, research has consistently shown that the majority of parent-adolescent conflict is neither chronic in its frequency nor excessively negative in terms of intensity. Rather, most families experience moderate levels conflict stemming from mundane, everyday topics such as chores and personal appearance (Hill, 1988; Laursen & Collins, 2004; Smetana, 1989). Second, parent-adolescent conflict is not necessarily marked by negativity and may be constructive to the relationship when it occurs in warm, supportive environments

(Laursen & Collins, 2004; Reuter & Conger, 1995). As such, there is a paucity of literature that has investigated other possible causes of the variance seen in parent-adolescent conflict. Indeed, Barber (1994) noted that few studies have examined patterns of family interaction that may be associated with these variations, and Laursen and Collins (2004) raised a concern about a lack of research examining context-specific features of parent-adolescent disagreements. Although some studies have begun to examine features such as conversational content and style, the research addressing the context-specific bases of parent-adolescent verbal conflict has emerged largely independently from one another, and it is therefore unknown how or if these contextual features interact over the course of a conflictual discussion.

As previously noted, affect is most certainly linked to parent-adolescent verbal conflict. However, affect has typically been assessed via observational and/or self-report data. Given that affect involves both behavioural and biological arousal (Gottman, 1991), it is useful to consider the biological foundations of affective states during conflict in addition to examining the contextual factors. A large body of work utilizing psychophysiological measures to examine affect and emotional responding does exist (Levenson, 1992, 2003). However, few have directly investigated physiological patterns of arousal between parents and adolescents in the context of family conflict (El-Sheikh et al., 2009). Of these studies (e.g., Lattimore, Gower, & Wagner, 2000), autonomic responding has only been examined in adolescents. Given that parent-adolescent relationships are bidirectional rather than unidirectional, these studies overlook the possibility that adolescents may influence their parents' responding and vice versa. The only studies that have utilized psychophysiological measures to examine dyads in conflict have been conducted with married couples (Gottman, 1979, 1990; Gottman & Levenson, 1986; Gottman, Notarius, Markman, Bank, Yoppi, & Rubin, 1976; Levenson & Gottman, 1983). Although the extant marital relationship literature has provided some insight into autonomic patterns of arousal

associated with dyadic conflict, romantic relationships are clearly different in nature than parent-adolescent relationships. Of the dyadic research investigating physiological responding conducted thus far, only inferences can be made to parent-adolescent relationships. Therefore, it is essential to investigate whether the interactions documented in these studies are unique to marital conflict or generalize to other family stressors, such as parent-adolescent conflict.

The following study is an effort to amend several gaps in the parent-adolescent conflict literature by using conversational and physiological data collected from parent-adolescent dyads during a face-to-face disagreement resolution task. To address the need to examine and identify context-specific features of verbal conflict, the relationships between conversational style, content, and valence was explored. To address the need to consider the biological underpinnings of affect and behaviour, patterns of physiological arousal during conflict was assessed for both the parent and adolescent. It is believed that this is the first study to examine the psychophysiological patterns of arousal of parent-adolescent dyads during verbal conflict. Finally, the links between arousal patterns and observed contextual features of the conflict were assessed. Results of his study may increase our understanding of how parent-adolescent dyads facilitate and inhibit physiological arousal during conflict and provide key information about the patterns of normative parent-adolescent conflict.

Literature Review

Parent-Adolescent Conflict

Adolescence was once conceptualized as a time of great storm and stress, marked by escalating defiance, rebellion, opposition, and conflict with parents (Blos, 1967; Erikson, 1968; Freud, 1958). More recent research on family relationships and adolescent development has largely negated these earlier beliefs. Rutter, Graham, Chadwick, and Yule (1976) found that approximately 75% of adolescents surveyed reported having pleasant relationships with their parents. The remaining 25% had histories of family difficulty that were present during childhood. In essence, Rutter and colleagues were able to demonstrate that not only are high levels of conflict not a normative marker of adolescence, these non-normative levels likely begin during childhood rather than adolescence. Montemayor (1983) found similar results, noting that only 20% of parents and adolescents surveyed reported serious, chronic difficulties and another 20% reporting intermittent problems in the relationship. Although turmoil characterizes a minority of families, these characteristics may be linked to dysfunctional family systems or individual psychopathology rather than adolescent development itself. Additionally, it is chronic conflict and fighting that has typically been linked to adolescent maladjustment (Smetana, 1996), rather than low levels of disagreement. Specifically, high levels of parent-adolescent conflict are associated with psychosocial problems during adolescence (Laursen & Collins, 1994), and are predictive of many adolescent externalizing behaviours and internalizing problems (Montemayor, 1986). Although the majority of families are able to utilize healthy patterns of communication with their adolescents that were drawn from patterns established in response to challenge from earlier ages, families that do not establish such effective strategies when children are young are at risk for dysfunctional communication during adolescence (Laursen & Collins, 2004).

Although chronic conflict has been shown to be atypical of adolescence, a moderate level of conflict is. In fact, moderate levels of conflict between adolescents and their parents have been shown to be associated with fewer adjustment problems for adolescents than those who report no conflict or frequent conflict (Adams & Laursen, 2001). Conflict is ever-present and inevitable in all close relationships, but especially between family members because of the numerous interactions occurring each day and potential for differing or incompatible goals (Laursen & Collins, 2004). As children enter adolescence, family conflicts tend to become less frequent but increase in affective intensity (Laursen & Collins, 1994; Laursen, Coy, & Collins, 1998). Adolescents report that nearly 40% of their daily conflicts are with a parent or sibling (Jensen-Campbell & Graziano, 2000). Compared to conflicts with friends, adolescents report that conflict with their parents involves more issues about daily hassles, negative affect after the conflict, power-assertion, and win/lose resolutions (Adams & Laursen, 2001).

Studies have shown that adolescents of both sexes are more likely to be involved in conflicts with their mothers than with their fathers (Montemayor, 1986; Noller, Atkin, Feeney, & Peterson, 2006). This may be due to the fact that adolescents spend more time talking with their mothers and discuss a broader range of topics than they do with their fathers (Noller & Bagi, 1985), because mothers are more involved in the socialization of their children (Montemayor, 1986), or because mothers are more likely to be enforcers of family rules and reprimand their children (Montemayor & Hanson, 1985). Parents and adolescents have also been shown to have differing views and experiences of their verbalized conflicts and communications. Parents are more troubled by bickering and nattering than are adolescents, and parents are more likely to keep hold of the affect after a negative interaction with their teen (Steinberg, 2001). Although most disagreements are about mundane topics such as chores, schoolwork, and appearance (Laursen & Collins, 2004), these disagreements appear to arise for differing reasons. Parents tend

to view disagreements on these topics as extensions of moral, personal safety, or conformity concerns, while adolescents tend to view them as matters of personal choice (Smetana, 1989). Conflict, then, may develop because adolescents view their parents' rules and behavioural demands as arbitrary rather than legitimate (Smetana, 1988). Additionally, when compared to an independent observer's report, adolescents tend to have more accurate views of unpleasant aspects of their relationship than do their parents (Laursen & Collins, 2004).

Given the previous findings, parent-adolescent conflict may actually serve several purposes in the context of the parent-adolescent relationship. Many studies have examined parent-adolescent conflict from a power or control perspective (Roloff & Miller, 2006). To socialize their children, parents teach their children skills and control their behaviour. In doing so, the child may resist and a struggle for control may begin (Laursen & Collins, 2004). Conflict may be a route by which adolescents can renegotiate their role within the family which, in turn, diminishes maternal authority (Steinberg, 1981). Parents and their adolescents may pursue differing goals regarding adolescent autonomy (Collins & Luebker, 1994), and challenge may rise from the changing nature of the parent-adolescent relationship (Laursen & Collins, 2004). It may also be that disagreements play an important role in simply facilitating communication within the family (Collins, Laursen, Mortensen, Luebker, & Ferreira, 1997). Indeed, Laursen and Collins (2004) argue that conflict may actually serve to strengthen the parent-adolescent relationship by serving as a way in which they can communicate. However, verbal conflict is only constructive when it is neither extreme nor chronic and when it arises in relationships marked by closeness and warmth.

Clearly, conflict and communication between parents and adolescents may facilitate or inhibit adolescent development (Valsiner & Cairns, 1992), and varies widely across families. Although some of the extant research has focused on normative or functional aspects of

moderate parent-adolescent conflict, researchers have focused largely on the frequency and intensity of conflict, honing in on age and gender variations (Barber, 1994; Montemayor, 1986). Variation in parent-adolescent conflict is likely due to several variables. Barber (1994) noted that little research has been conducted to examine patterns of family interaction associated with these variations, and Laursen and Collins (2004) raised a concern about the lack of research studies that examine context-specific features of parent-adolescent disagreements. To provide further insight into verbalized conflict episodes that are particular to parents and their adolescents, researchers have begun to examine more specific aspects of parent-adolescent conflict episodes including conversational style, content, valence, and even biological responding.

Conversational Style and Parent-Adolescent Conflict

Research has shown that verbal interactions between parents and adolescents change significantly across the adolescent period. Mothers and children have been shown to interrupt each other more during adolescence (Beaumont, 1995; Hill, 1988). However, there are conflicting views as to why this pattern emerges during adolescence. Some developmental theorists view interruptions from a power perspective and believe the increase in interruptions is a bid by adolescents to dominate their mothers as family relationships begin to evolve (Hill, 1988; Steinberg, 1981). Sociolinguists have critiqued this view, emphasizing that the bid for dominance would imply an underlying meaning behind the interruptions. Sociolinguists maintain that interruptions are merely elements of communication, not bids for power or autonomy.

Using a sociolinguistic approach to analyzing discourse, Tannen (1983, 1984) identified two conversational styles marked by pauses, rates of speech, and use of interruption that individuals use to communicate. The first, a high-involvement style, utilizes a fast rate of speech, short pauses between speaking turns and frequent use of simultaneous speech (talking at the same time as their partner) and serves to help speakers build rapport and signal involvement with

their partner. The second style, high-considerateness, utilizes a slower rate of speech, longer pauses between speaking turns and avoids the use of simultaneous speech and serves as a way to for the speaker to adhere to the principle of not imposing on their partner. These styles are conceptualized as being along a continuum rather than representing discrete categories of style. Speakers with similar styles have the most successful conversations (Tannen, 1984; Scollon, 1985) and tend to form more positive perceptions of the conversation and of each other (Tannen, 1984). In contrast, a 'clash' may occur when speakers use differing styles, which may result in increased interruptions and lead to misjudgment or misunderstanding (Tannen, 1984).

Beaumont and colleagues (Beaumont, 1995, 2000; Beaumont & Cheyne, 1998; Beaumont, Vasconcelos, & Rugerri, 2001) applied this sociolinguistic approach to the study of parent-adolescent conflict. Beaumont (1995) maintains that interruptions occur unintentionally between parent-adolescent dyads because they have developed differing conversational styles, with the greatest style differences occurring between adolescents and mothers, rather than fathers (Beaumont & Wagner, 2004). Indeed, parents tend to use a high-considerateness style with few uses of interruptions, simultaneous speech, or overlaps between turns when speaking with their adolescents. Adolescents, however, tend to use a high-involvement style with frequent interruptions and use of simultaneous and overlapping speech. This was found to be a pattern for both boys and girls, and appears to increase in use from preadolescence into adolescence. Consequently, adolescents tend to have successful conversations with one another because they use similar high-involvement conversational styles, which may develop as adolescents begin to spend more time with their friends (Crocket, Losoff, & Petersen, 1984). Because parents and adolescents tend to have differing styles, they are likely to experience a clash in communication which may result in negative feelings (Beaumont & Wagner, 2004; Tannen, 1984). However, the

use of similar styles between mothers and adolescents has been shown to be related to positive perceptions of the conversation as reported by the adolescent (Beaumont & Wagner, 2004).

Overall, it appears that the conversational styles of parents and adolescents may not be entirely compatible, leading to negative feelings and misunderstanding that could pose a barrier to effective communication. However, outside these two bodies of research, conversational style has not been examined with conversational factors beyond affect. It may be that other conversational factors, such as content, play a role in these styles and whether or not they create a 'clash' between speakers.

Content and Valence of Parent-Adolescent Conflict

The literature on parent-adolescent conflict is rife with broad descriptors of 'negative interactions' and 'positive interactions.' Yet, few studies have attempted to hone in on what, exactly, comprises such interactions. Seemingly, most studies are referring to the overall affective quality of the interaction when it is labeled as positive or negative as is evidenced by the large amount of research on the topic. However, it may be that an interaction is made negative not just by the emotion behind the words that were spoken, but by the content or wording of the conversation. Alternately, it may be a combination of both.

Content

Research has consistently shown that the general content of parent-adolescent verbal conflict tends to be about mundane topics (Hill, 1988; Laursen & Collins, 2004; Smetana, 1989). Schenk and Schenk (1978) found that the most salient issues for adolescents were those regarding personal possessions, territory, and time, status, and emotional support. Although it is known what conflicts tend to be about in a topical sense, less attention has been paid to the conversational content behind these issues. Studies have utilized micro-behavioural coding schemes to investigate the content of parent-adolescent conversations, but a methodological

concern is that many researchers collapse distinct content code categories to create broader content constructs (i.e., "hostile," "parent aversive discipline,") (e.g., Granic, Hollenstein, Dishion, & Patterson, 2003; Stoolmiller & Snyder, 2004). Although this is useful for examining specific constructs, the micro-behaviours are lost. This is especially problematic for investigating normative trends in conversational content. Thus, despite this body of research, little is known about the content of parent-adolescent conflicts at a micro-behavioural level.

Valence

Few studies have considered conflict affect (Laursen & Collins, 2004). Research seems to be focused on behaviours associated with affective states, rather than on the emotion itself. Of the studies conducted on conflict affect, most have linked negative affect to relational conflict and relatively little is known about the links to positive affect.

Negative emotion has been shown to be particularly disruptive in dyadic interactions (Flannery, Montemayor, Eberly, & Torquati, 1993) and when expressed by both members of the dyad, is correlated with the intensity of conflict (Snyder, Edwards, McGraw, Kilgore, & Holton, 1994). Although the decline in conflict frequency from early to late adolescence has been noted, negative affect tends to increase and positive affect tends to decrease in parent-adolescent interactions as adolescents mature (Flannery, Montemayor, Eberly, & Torquati, 1993). In particular, anger increases from early to mid-adolescence and stabilizes thereafter (Laursen & Collins, 2004). Among families in a hostile environment, conflict increases and the quality of the relationship decreases during adolescence. However, among families with warm and supportive environments, conflict lessens and the relationship quality improves. Additionally, these observed interaction styles are strongly correlated with specific behaviours viewed one year later (Reuter & Conger, 1995), indicating that patterns of parent-adolescent conflict may be stable over time.

Aversiveness is an affect/behavioural construct that has frequently been examined in the parent-child literature in the contexts of social learning and developmental psychopathology. However, coercive cycles and aversive processes present in childhood may shed light on parent-adolescent interactions. It has been demonstrated consistently that displays of negative affect are shaped and maintained by reinforcement contingencies within the homes of delinquent and aggressive children. Some of this reinforcement is positive (Patterson, DeBaryshe, & Ramsey, 1989), whereby aggressive children obtain instrumental gains (e.g., access to valued objects) by escalating negative affect. Equally and perhaps more important, are negative reinforcement contingencies in which children can predictably terminate continued conflict with family members by escalating their own negative affect (Patterson, 1982; Snyder et al., 1994; Wahler, Williams, & Cerezo, 1991). Parents of aggressive youth have been shown to escalate rather than attenuate negative affect in arguments with their children, only to defer once their child's behaviour reaches an intolerable level of aversiveness. In turn, parental escalation of aversive behaviours produces longitudinal increases in both the frequency and intensity of negative affect displays in children (Patterson, 1982). Snyder et al. (1994) also found that mothers of nonaggressive children continuously worked to de-escalate conflict at all levels of child aversiveness and were more able to soothe their child or reduce ambient arousal, whereas mothers of aggressive children were less adept at regulating their own affect and tended to counter a negative emotion with another negative emotion rather than work to dampen the intensity. Thus, specific parenting practices, including inconsistency, deferring to displays of negative affect, and over-reactivity, or matching and escalating negative affect, appear to influence the development of adaptive emotional and communicative behaviours in children. Montemayor (1986) contended that the processes that lead to these aversive interchanges in childhood may be similar to those that lead to parent-adolescent conflict.

Studies from marital conflict literature have also provided some insight into parent-adolescent communication and conflict. Humor, laughter, support, and low rates of defensiveness have been found in non-distressed couples (Levenson & Gottman, 1983), whereas couples in distressed marital relationships express significantly higher rates of negative affect (Gottmann & Levenson, 1986) and are more disruptive, negative, and hostile during conflict-resolution tasks (Gottman, Notarius, Markman, Bank, Yoppi, & Rubin, 1976). Similar to coercive cycles between parents and young children, distressed married couples more likely to respond to an aversive behaviour with an aversive behaviour (Gottman, 1979). Perhaps most applicable to the study of parent-adolescent conflict, Gottman (1991) hypothesized that the escalation of aversive or negative behaviour may produce an 'emotional flooding' that reduces the cognitive processing required to produce constructive conflict resolution strategies. These negative emotional states increase the reliance on over-learned maladaptive interaction patterns and reduce the range of behavioural and cognitive responses an individual has available to cope with environmental demands, such as problem solving.

Autonomic Nervous System and Parent-Adolescent Conflict

As the previously reviewed literature indicates, affect is linked to parent-adolescent verbal conflict in a variety of ways. However, it is important to consider that in these studies, affect has only been assessed via observational or self-report data. Affect involves both behavioural and biological arousal (Gottman, 1991) that is generally experienced as being negative or positive in nature. Regardless of the valence, affective states have an impact on cognition and behaviour that corresponds with how an individual is able to cope with environmental demands. Therefore, when examining parent-adolescent relations, it is important to consider the biological underpinnings of conflict behaviours in addition to examining the contextual factors of the conflict itself.

Overview of the Autonomic Nervous System

The discipline of psychophysiology is concerned with the interaction of psychological events and biological processes. Physiological responses are sensitive indicators of how individuals respond to their environment. Such responses are a result of the autonomic nervous system (ANS), which serves to regulate the body's internal environment and organs such as the heart, lungs, and sweat glands. Within the ANS are two subsystems: the sympathetic nervous system (SNS) and the parasympathetic nervous system (PNS). The SNS primarily serves to stimulate and mobilize bodily energy resources in threatening situations (i.e., "fight-or-flight" responses), with sympathetic changes generally indicating psychological arousal. Alternately, the PNS primarily serves to conserve energy within the body (i.e., "rest and repose" responses), with parasympathetic changes typically indicating psychological relaxation or withdrawal. Target organs within the body receive opposing SNS and PNS input, and are therefore regulated by relative levels of activity from each system. The cardiovascular and electrodermal systems provide particularly robust indices of ANS activity (for reviews, see Brownley, Hurwitz, & Schneiderman, 2000; Dawson, Schell, & Filion, 2000), and provide useful information for examining the complex relationship between behaviour and environment that is not otherwise accessible through behavioural observations or self-report data alone.

Cardiovascular Reactivity

Heart rate (HR) is a commonly used measure of cardiovascular reactivity. However, the heart is dually innervated by both the parasympathetic and sympathetic nervous systems, meaning HR responds to influences from both systems (Newlin & Levenson, 1979; Porges, 1995) which can independently influence the direction and magnitude of HR change (Cacioppo, Berntson, Binkley, Quigley, Uchino, & Fieldstone, 1994; Cacioppo, Uchino, & Berntson, 1994). These findings indicate that, in terms of cardiovascular reactivity, examining independent

indicators of PNS and SNS influences upon the heart may provide more information than HR alone.

Respiratory Sinus Arrhythmia (RSA)

Parasympathetic influence on cardiac activity, often referred to as vagal tone, is indexed by assessing RSA, or the degree of ebbing and flowing of heart rate during the respiratory cycle (Berntson et al., 1997). Vagal influences typically modulate sympathetic activity under conditions of emotional challenge or environmental demand (Porges, 1995). Activity of the myelinated vagus operates as a "vagal brake" to quickly regulate these responses. Under perceived safe conditions, the "vagal brake" works to inhibit sympathetic arousal, induce a calmer state, and facilitate the sustained attention required for social engagement. This results in a vagally-mediated deceleration of HR and increase in RSA (high vagal tone). Under perceived conditions of stress or threat (Porges, 1995) or during tasks requiring significant cognitive or psychological effort (Cacioppo et al., 1994), the "vagal brake" withdraws to facilitate sympathetic arousal and mobilizes fight-or-flight defensive reactions. This parasympathetic withdrawal is characterized by sympathetically-mediated HR acceleration and a decrease in RSA (low vagal tone). Under both of the aforementioned conditions, the association between perceived conditions and vagal influence is functional and adaptive. However, prolonged decreases in RSA in response to safe or non-threatening conditions (i.e., conditions that would typically inhibit sympathetic responding) is suggestive of an inability to properly adjust to environmental demands (Porges, 1995) and reflective of parasympathetic dysregulation (Friedman, 2007) which may manifest in behaviour and/or personality (Porges, 1995; 2007). Therefore, RSA is a useful index of an individual's ability to physiologically and behaviorally react, self-regulate, and self-soothe during differing environmental demands.

Cardiac Pre-ejection Period (PEP)

PEP is a systolic time interval between the depolarization of the left ventricle of the heart and ejection of the blood into the aorta (Sherwood, Allen, Fahrenberg, Kelsey, Lovallo, & van Doornen, 1990) that measures cardiac contractility (Newlin & Levenson, 1979). Because this interval is determined solely by SNS influences, shortened PEPs are indicative of an individual's response to stress or challenge, thus corresponding to accelerations in HR. Shortened PEPs also reflect greater sympathetic activation needed for behavioural approach behaviours (Sherwood, Allen, Obrist, & Langer, 1986; Sherwood et al., 1990). Additionally, studies in normal samples have shown that behaviours that facilitate goal-directed activity are marked by fluctuations in PEP, with attenuated PEP specific to conditions of reward (Brenner, Beauchaine, & Sylvers, 2005). In combination with more heavily parasympathetically-mediated markers of cardiovascular activity such as RSA, PEP can be used to partition components of autonomic activation that are unique to individuals and patterns of behaviour.

Cardiovascular Response Patterns

Physiological systems do not work in isolation from one another; rather autonomic reactivity happens as a part of a complex of responses mediated by the ANS (El-Sheikh et al., 2009; Levenson, 1992). As such, there are varied and flexible ways in which individuals may respond to conflict or stress. Berntson, Cacioppo and colleagues (Berntson, Cacioppo, & Quigley, 1991; Berntson, Cacioppo, Quigley, & Fabro, 1994) developed a taxonomy for classifying individuals based on cardiac sympathetic and parasympathetic responses to psychological stressors by comparing magnitude and direction of sympathetic and parasympathetic difference scores. This classification system yielded four autonomic profiles: Reciprocal sympathetic activation, reciprocal parasympathetic activation, coactivation, and coinhibition (See Table 1).

Table 1
Autonomic Nervous System Profiles

ANS Profile	PNS Activity	SNS Activity	HR	Arousal Effect
Reciprocal Sympathetic Activation	↓ RSA	↓ PEP	↑	Increase
Reciprocal Parasympathetic Activation	↑ RSA	↑ PEP	↓	Decrease
Coactivation	↑ RSA	↓ PEP	↕	Unclear
Coinhibition	↓ RSA	↑ PEP	↕	Unclear

Reciprocal patterns occur when both branches of the ANS produce the same directional response. This reflects a coordination of ANS branches, and is believed to more amenable to adaptive coping responses (El-Sheikh et al., 2009). In particular, reciprocal sympathetic activation is marked by sympathetic activation and parasympathetic inhibition, which serves to mobilize sympathetic responding to meet environmental and/or metabolic demands. This autonomic pattern is evidenced by decreases in PEP and RSA and an increase in HR (Berntson et al., 1991, 1994). Reciprocal sympathetic activation is the most highly reactive profile and is adaptive for individuals to adjust to challenge or stress (Alkon, Goldstein, Smider, Essex, Kupfer, & Boyce, 2003) or make constructive efforts to reduce conflict (El-Sheikh et al., 2009). Alternately, reciprocal parasympathetic activation is marked by parasympathetic activation and sympathetic inhibition, which serves to downregulate physiological processes and calm overall functioning. This autonomic pattern is indicated by increases in PEP and RSA and a decrease in HR (Berntson et al., 1991, 1994). Reciprocal parasympathetic response patterns are indicative of self-soothing ability and are likely most effective in situations where a calm state is beneficial (El-Sheikh et al., 2009).

Non-reciprocal patterns occur when both branches of the ANS produce opposing responses. This suggests a disorganization of regulation in which one branch of the ANS fails to function adaptively to stress, and may result in ambiguous or maladaptive physiological

responding to environmental stressors (El-Sheikh et al., 2009). The first non-reciprocal pattern, coactivation, is marked by concurrent parasympathetic and sympathetic activation and is evidenced by increases in RSA and decreases in PEP. HR may increase or decrease, depending on the degree of influence from either branch of the ANS (Berntson et al., 1991, 1994). Coactivation indicates that a parasympathetic response is insufficient for managing a stressor, prompting sympathetic responding (El-Sheikh et al., 2009). Coactivation is evoked in response to low-intensity or aversive stimuli (Berntson, Cacioppo, Quigley, & Fabro, 1994), and may promote dysregulated fight-or-flight responses to conflict when such responding is maladaptive or inappropriate. The second non-reciprocal pattern, coinhibition, is marked by concurrent parasympathetic and sympathetic inhibition and is indicated by decreases in RSA and increases in PEP. As with the coactivation pattern, HR may increase or decrease depending on the degree of influence from either branch of the ANS (Berntson et al., 1991, 1994). Coinhibition allows parasympathetic withdrawal to meet metabolic demands, yet does not permit a sufficient sympathetic response. Coinhibition patterns have been linked to increased exposure to stress, and may promote passive behaviours in stressful situations (El-Sheikh et al., 2009).

In sum, these four autonomic profiles may highlight the nuances in individual autonomic responding to challenge or stress, and may provide important information about relations with parent-adolescent conflict.

Electrodermal Responding (EDR)

Electrodermal responding is a measure of psychologically induced sweating of the eccrine sweat glands, which are densely located on the palms of the hand. Eccrine glands are entirely under sympathetic control, thus any changes in electrodermal activity are due to sympathetic activation. The electrodermal system is associated with affective processes, arousal, orienting, and attention, and increases in skin conductance responses (SCRs) may be elicited by

emotional, novel, unexpected, or salient stimuli in the environment. Psychological meaning of SCRs become interpretable only when the stimulus condition in which the response occurred is considered (Dawson et al., 2000). EDR has been linked to several specific emotions including fear, anger, and digust (Levenson, 1992). Fowles (1988) argued that EDR is influenced by a behavioural inhibition system involved in responding to punishment, passive avoidance and frustrative non-reward, and viewed this as an anxiety system. Indeed, increases in EDR have been observed in conditions of passive avoidance or perceived mild punishment (Katkin, 1965), and aversive stimuli (McManis, Bradley, Berg, Cuthbert, & Lang, 2001). Additionally, individual differences in the rate of SCRs have been used to describe an individual "electrodermal lability" trait that has shown to be stable over time (Crider, 1993). Electrodermal labiles refer to those who show high rates of SCRs, whereas electrodermal stabiles show few SCRs. Labiles perform better than stabiles on tasks that require sustained vigilance and are better able to keep focused attention (Vossel & Rossmann, 1984). Electrodermal lability may therefore reflect the ability of individuals to allocate information processing capacities to attend to and process information (Katkin, 1975), and is generally considered to be an adaptive response to stress (El-Sheikh et al., 2009). Overall, EDR has been shown to be a robust indicator of general states of arousal and is useful for examining attentional processes, stimulus significance, and individual differences that may be linked to behavioural or psychological states.

Relations Between ANS and Parent-Adolescent Conflict

A large body of research does exist that utilizes psychophysiological measures to investigate various aspects of family and family relationship processes. Unfortunately, little research has directly examined the psychophysiology associated with parent-adolescent conflict. Therefore, some of the autonomic processes that may be involved in parent-adolescent verbal

conflict can only be inferred from extant family literature such as research focused on marital conflict.

Marital Conflict

Although marital relationships are markedly different from parent-adolescent relationships, it is possible that in parent-adolescent dyads the experience of reciprocity is similar to married couples. Research from marital conflict literature has shown some robust linkages between autonomic responding and marital discord that may be useful in interpreting autonomic responding between parent and adolescent dyads. Some of this research has focused on responses between married couples in distress. For example, Levenson and Gottman (1983) found that physiological linkage, or corresponding levels of high ANS reactivity, accounted for 60% of the variance in dissatisfied marriages. This physiological linkage can be paralleled with coercive cycles with parents and young children when like affect begets like affect. Gottman (1990) suggested that among married couples, multiple modes of physiological arousal (e.g., increased HR and increased SCRs) are associated with decreased information processing capability and a reliance on over-learned patterns of behaviour and cognition, particularly those associated with sympathetic reactivity. Additionally, Katz and Gottman (1995) found that, among adults, high vagal tone served as a buffer from the effects of marital hostility.

Other studies have focused on how exposure to marital conflict affects children. Exposure to marital conflict has been shown to activate both sympathetic and parasympathetic stress response systems in children (El-Sheikh, Harger, & Whitson, 2001). Lower RSA was found in children exposed to marital violence (Katz, 2007; Porter, Wouden-Miller, Silva, & Porter, 2003), and this may be linked to the exposure to inappropriate or adverse socialization experience, such as parental negativity or family discord (Hastings, Nuselovici, Utendale, Coutya, McShane, & Sullivan, 2008). However, El-Sheik et al. (2001) found that higher vagal

tone may act as a protective buffer against psychological disorders and health problems for children exposed to frequent verbal marital conflict. Additionally, children who exhibited patterns of reciprocal activation were at less risk for externalizing problems following exposure to conflict, whereas children with non-reciprocal patterns of autonomic responding were significantly more at risk (El-Sheikh et al., 2009). Similarly, Gottman and Katz (2002) found children with higher vagal tone were more reactive and able to return to baseline more quickly than children low in vagal tone, further supporting studies that maintain vagal tone is related to the ability to self-soothe and regulate emotion during environmental challenge. In terms of perceptions of family conflict, Salomon, Matthews, and Allen (2000) found that both children and parents with coinhibition profiles perceived significantly higher levels of family conflict than coactivators. Children with coinhibition profiles also reported the highest levels hostile affect in the home environment whereas children with coactivation profiles perceived family environments to have the least amount of hostility, suggesting that coactivators may have more adaptive interactions within their environments. Alternately, children with parasympathetic withdrawal patterns (i.e., sympathetic and coinhibition) reported more conflict, suggesting that these groups may have less adaptive interactions within their environment.

Specific Emotions

Given that emotion, and negative emotion in particular, has consistently been indicated as a factor in parent-adolescent conflict, it is important to consider how emotions can play a role in autonomic responding. The ANS is closely involved in the subjective emotional experience (Levenson, 2003). Emotions are short-lived psychological-physiological occurrences that represent modes of adaptation to changing environmental demands. Psychologically, they alter attention and organize behaviour hierarchies and organize biological systems to produce facial expression, vocal tone, and ANS activity (Levenson, 2003). Positive emotions such as

amusement, contentment and happiness efficiently deactivate physiological systems. These positive emotions appear to be functional in that they calm physiological responding and reduce tension (Levenson, 2003). Negative emotions such as fear, anger, and disgust typically activate physiological systems in preparation for fleeing for fighting (Levenson, 2003). Hostility, aggression, anxiety linked to prolonged decreases in RSA (Beauchaine, 2001), reflecting parasympathetic dysregulation**.** Anger, fear, and sadness produce larger HR accelerations, and fear and disgust are associated with larger SCRs than happiness. Disgust is also associated with parasympathetic withdrawal. These patterns of emotion-specific ANS reactivity have been found across age, gender and culture (Levenson, 1992).

Emotion Regulation

Studies of normal samples have found several links between vagal tone and affective processes. Preliminary evidence of this link was provided by studies suggesting that children with high vagal tone are better able to regulate their emotional reactions than are those with low vagal tone (Fabes, Eisenberg, Karbon, Troyer, & Switzer, 1994). High vagal tone is also associated with greater reactivity to stimuli and the ability to self-soothe under duress (Movius & Allen, 2005). However, excessive vagal reactivity appears to be related to emotional lability of a fight-flight nature. Because near complete vagal withdrawal is associated with adaptive responses to threat, individuals with reduced baseline parasympathetic tone may be at risk for fight/flight responding in situations of psychological or cognitive challenge. In normative samples, these are conditions that elicit moderate vagal withdrawal, as indexed by RSA reductions. In sum, attenuated RSA appears to be a non-specific marker of poorly regulated emotional responding and could serve as an important indicator of adaptive emotional responding during parent-adolescent conflict.

Emotional Expressiveness

There is also evidence that viewing another person in distress elicits specific corresponding ANS responses indicative of emotional states (Eisenberg, Fabes, Bustamante, Mathy, Miller, & Lindholm, 1988; Levenson & Ruef, 1992; Walbott, 1991). These autonomic response patterns appear to be consistent across gender, age, and culture, and serve to recruit the physiological resources needed to regulate and respond to emotional cues (Levenson, 1992; Levenson & Ruef, 1992). Changes in the ANS are also responsible for expressive changes in the eyes and facial muscles that are important for emotional communication. The mere act of smiling has been found to be linked to sympathetic deactivation and overall physiological calming (Levenson, 2003). Studies in normal samples have shown that expressions of emotion are also accompanied by changes in RSA (Porges, 1995), with higher vagal tone being associated with greater facial expression of emotion (Movius & Allen, 2005). Thus, different patterns of ANS responding appear to be important for empathy reactions, which may play a critical role in effective parent-adolescent communication.

Emotion Contagion and Empathy

Emotions can also be considered to be contagious, as individuals tend to become emotional in the presence of others who are emotional. Emotion contagion often occurs in dyads, with one person coming to know or feel the emotions of another. It is critical to social bonding, attachment, and can lead to prosocial helping behaviours. ANS activation in a person observing another's distress indicates that emotion contagion has occurred, and is a marker of shared and interconnected emotional states (Levenson, 2003). Children who have high vagal tone are likely to be high in affective responsiveness, and appear to have the regulatory ability to modulate their arousal. Therefore, they are likely to experience empathy (Eisenberg, Fabes, Murphy, Maszk, Smith, & Karbon, 1995) and behave in other-oriented ways (Fabes, Eisenberg, & Eisenbud,

1993). Children who exhibit greater autonomic reactivity and are less able to regulate this arousal are likely to focus on their own emotional states when confronted with another person's distress (Wood, Saltzberg, & Goldsamt, 1990). Consequently, children with low vagal tone are more likely to become physiologically aroused in such situations and may adopt avoidant means to cope with the arousal. Thus, these children are less likely to show empathetic comforting responses. Children with high vagal tone, however, are more expressive and are likely to use constructive coping responses when confronted with others in distress (Fox, 1989). Indeed, Eisenberg et al. (1995) found that higher RSA predicts expressions of empathy for others and a general level of social competence. These findings are consistent with the view that children with high vagal tone are more likely to adaptively cope with stressors in their environment. Thus, adaptive responding to the emotions of others and the ability to express empathy may play a role in how parents and adolescents respond during disagreements and the escalation or de-escalation of conflict.

Hypotheses

As the literature review suggests, this thesis serves as an exploratory study to identify contextual and autonomic correlates of parent-adolescent conflict. To guide data analysis, specific hypotheses and general research questions are organized within two major objectives.

Objective 1

The first objective will be to examine the context-specific components of content, valence, and conversational style during a parent-adolescent conflict resolution task. Regarding conversational style, it was hypothesized that parents will tend to exhibit a high-considerateness conversational style and adolescents will tend to exhibit a high-involvement conversational style thereby replicating findings by Beaumont and colleagues (e.g., Beaumont, 1995; Beaumont & Wagner, 2004). No other specific hypotheses were put forth. However, the following research questions were addressed: (1) Are the individual conversational speech acts (e.g., interruptions, listener responses) by mothers and adolescents systematically related? (2) Do mothers and adolescents differ in their amount of content and/or valence use? (3) Are individual conversational style speech acts systematically associated with content and/or valence?

Objective 2

The second objective will be to examine the correspondence of autonomic responding of parent-adolescent dyads and the context-specific components observed during the conflict resolution task. No specific hypotheses were put forth, however the following research questions were addressed: (1) Are content and/or valence systematically associated with individual psychophysiological measures for adolescents and mothers? (2) Are either of the conversational styles and/or any of the individual speech acts systematically associated with individual psychophysiological measures for adolescents and mothers? (3) Do content and/or valence correspond with specific autonomic response profiles for adolescents and mothers? (4) Do either

of the conversational styles and/or any of the individual speech acts correspond with specific autonomic response profiles for adolescents and mothers?

Method

Participants

Data for this study were drawn from a three-year National Institutes of Mental Health (NIMH) funded longitudinal investigation of comorbidity of conduct disorder and depression in children and young adolescents conducted at the University of Washington. Although morbidity is not of central interest to this study, a description of the generation of participants is useful in understanding the underlying sources of variance within the final sample used. Following Institutional Review Board approval, parents of children were recruited through fliers, newspaper ads, community centers and mental health service providers serving suburban and urban communities in the greater Seattle, Washington area. Parents who responded to the ads completed a computerized structured telephone interview to determine their child's potential eligibility. Parents answered questions from the Aggression, Attention Problems and Anxious/Depressed subscales of the Child Behavior Checklist (CBCL; Achenbach, 1991) and from the conduct disorder (CD), oppositional defiant disorder (ODD), attention-deficit/ hyperactivity disorder (ADHD), and major depressive disorder (MDD) subscales of the Adolescent Symptom Inventory (ASI; Gadow & Sprafkin, 1997). The ASI provides dimensional scores and diagnostic cutoffs for several *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV*; American Psychiatric Association, 2000) syndromes and was used to screen participants with high likelihood of meeting criteria for internalizing and/or externalizing disorders. Each symptom is assessed on a 4-point scale (0 = *never*, 1 = *sometimes*, 2 = *often*, 3 = *very often*), with a rating of 2 or higher considered positive for a diagnostic criterion. Parent responses on the ASI also demonstrate concurrent validity with the aggressive behaviour and delinquency subscales on the Child Behavior Checklist (CBCL; Achenbach, 1991). Children were included in the conduct disorder group if they met *DSM–IV* criteria for CD, ODD, and

ADHD (hyperactive-impulsive or combined subtype) and scored at or above the 98th percentile on the Attention Problems and Aggression subscales of the CBCL. Children were included in the depressed group if they met *DSM–IV* criteria for MDD and scored at or above the 98th percentile on the Anxious/Depressed subscale of the CBCL. Children were included in the comorbid group if they met criteria for both the conduct disorder and the depressed group. Children in the control group were required to score below the 60th percentile on the CBCL scales and to exhibit no more than two symptoms of any ASI-assessed disorders.

Participants who met the above criteria (n = 216) were invited to the University of Washington for four 1-2 hour physiological assessments over the course of three years, for which they were paid a total of $350 and reimbursed for parking costs. At the third-year time point, participants were invited to participate in an optional, additional visit to the lab to take part in the family discussion task for an additional $50 compensation and reimbursement of parking cost. This sub-sample included 103 adolescents (37 female, 66 male) ranging in age from 10 to 15 (M=12.51). The racial/ethnic composition included 28.2% minority participants (9.7% African American, 5.8% Asian American, 6.8% Hispanic/Latino and 5.8% Other), which is reflective of the Seattle area.

From the above sample, a subset of 40 families was selected for this study. Financial and time constraints limited the amount of data that could be coded. The selection of cases for this study began with the identification of cases with completed conversation transcription (n = 85). Next, dyads were chosen to make adolescent gender and diagnostic distribution as even as possible. Blind to the conversational data, cases were selected for this demographic information alone. The final sample included 40 adolescents (18 female, 22 male) ranging in age from 10 to 15 (M=12.58) and their mothers. Eleven dyads self-reported their racial/ethnic background as

non-Caucasian which, again, is reflective of the Seattle area. Demographic and diagnostic characteristics are summarized by group in Table 2.

Table 2
Demographic and Diagnostic Characteristics (n = 40)

Males	55.0% (*n* = 22)
Females	45.0% (*n* = 18)
Age (years)	12.58 (1.38)
Minority Status	27.5% (*n* = 11)
Annual Family Income (Thousands)	51.75 (34.05)
Single Parent Home	40.0% (*n* = 16)
Maternal Education	
High School	10% (n = 4)
Some College	55% (n = 22)
College Graduate	25% (n = 10)
Professional or Graduate Degree	10% (n = 4)
Diagnostic criteria met for conduct disorder group	25.0% (*n* = 10)
Diagnostic criteria met for depression group	22.5% (*n* = 9)
Diagnostic criteria met for comorbid group	25.0% (*n* = 10)
Diagnostic criteria met for control group	27.5% (*n* = 11)

Procedure

Discussion Task Protocol

Active informed consent was obtained from parents and adolescents according to procedures approved by the University of Washington Human Subjects Review Committee. Parents and adolescents were asked to attempt to resolve an area of family disagreement using a modified revealed differences task that has been used in multiple studies (e.g., Allen et al., 2003; Beijersbergen, Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2008; Strodtbeck, 1951). Participating dyads were given a short list of areas of conflict (e.g., chores, grades, friends) that parents and adolescents commonly have and were asked to rank the top three items that they disagree about in private. Trained research assistants reviewed the lists for common issues and chose the top-ranking topic that both the parent and adolescent were willing to discuss.

Psychophysiological Protocol

Participants were instructed to avoid caffeine and over-the-counter medications 24 hours prior to their visit to minimize effects on psychophysiological recordings. Similarly, participants were asked to discontinue stimulant medications (if applicable) 36 hours prior to the laboratory visit. Dyads were seated facing one another in a sound-attenuated room. Patterns of cardiac and electrodermal activity for both the parent and the adolescent were measured during a 5-minute baseline. After the baseline, dyads were informed by the research assistant of their discussion topic and were given 8 minutes in the room alone to attempt to resolve the area of disagreement. Dyads were filmed by video camera throughout the discussion task and psychophysiological measures were continuously recorded (see below).

Discussion Task Coding

Temporal Conversational Style (TCS)

The TCS (Beaumont, 1993; 1995) codes how each parent-adolescent conversation is organized and constructed. To facilitate coding of the conversation data, video recordings were transcribed verbatim in turn-taking fashion. Instances where the parent and adolescent spoke at the same time were noted in the transcripts by typing overlapping words within forward slash marks and ensuring that lines of overlapping text were aligned within the transcript. Working from video-recordings and verbatim transcripts for accuracy, each speaker's turn in conversation was coded in one of five ways: *listener response, overlap, successful or unsuccessful interruption* or *no turn-taking violation* (see descriptions below). Coding was completed by four research assistants who completed 10 hours of training prior to beginning. Each research assistant was permitted to make corrections when errors in the original transcriptions were discovered. Bi-weekly recalibration meetings were held to minimize coding drift. Inter-rater reliability was calculated for 25% (n = 10) of the dyad discussions. Overall agreement was found to be excellent with a Cohen's kappa of .89 (Cohen, 1960).

The TCS codes are defined as follows:

1. Listener Responses (LR) are typically one- or two-word utterances (e.g., mm-hmm, that's right) made by the second speaker to indicate to the first speaker that he/she is listening and attending to the conversation or to encourage the first speaker to keep talking. Listener responses are not made in an attempt for the speaker to take hold of the conversational floor.
2. Overlaps (O) occur when both the parent and the adolescent speak simultaneously, but neither is clearly being interrupted. Overlaps in speech are merely unintentional disruptions of the timing of speech turn-taking. Overlaps were coded in instances where the second speaker cut off only one word of the first speaker's complete utterance or when both speakers begin to talk at the same time following a pause. In both cases, an O code is credited to the speaker who ends up holding the conversational floor.
3. Successful interruptions (SI) occur when the second speaker intentionally tries to take the conversational floor while the first speaker is still talking and successfully ends up holding the floor. The SI code is credited to the interrupter.
4. Unsuccessful interruptions (UI) – Alternate to the SI code, unsuccessful interruptions occur when the second speaker intentionally tries to take the conversational floor while the first speaker is still talking, but does not take over the conversational floor. Unsuccessful interruptions are coded based on whether the utterance is complete (UIC) or incomplete (UII) and are credited to the interrupter.
5. No turn-taking violations (N) – If a speaker's turn does not violate conversational turn-taking rules as are described above; it is simply coded as N to ensure that each turn of talk throughout the conversation is given a code.

Treatment of TCS Data

Following the protocol described by Beaumont and colleagues (see Beaumont, 2000; Beaumont, Vasconcelos, & Ruggeri, 2001; Beaumont & Wagner, 2004), the conversational style codes were adjusted to capture and control for the frequency of each speaker's use of each utterance type. First, the frequencies of each speaker's utterance type (LR, O, SI, UIC, UII, N) were summed across the entire 8-minute conversation. Because the frequency of an individual's speech acts can vary with the amount of time that person spends talking, the raw frequencies for each individual speaker were then transformed into rates by dividing by the number of words that person spoke. These calculations (i.e., frequency/words) produce extremely small rates due to the denominators being so large. To adjust for this, each rate was then multiplied by a constant of the average number of words spoken across all speakers in the sample (i.e., 673) for the duration of the conversation. This formula was adapted from previous studies (e.g., Hill, 1988; Kollock, Blumstein, & Schwartz, 1985) and serves to reflect the number of speech acts that occurred for the number of words the average participant spoke during the 8-minute discussion. For instance, if an adolescent used 10 listener responses and spoke 500 words, the calculated rate without using a constant would be 0.02. However, when this rate is multiplied by the constant of 673 words, the rate is 13.46. This new rate reflects a *corrected* rate of 13.46 listener responses in 8 minutes of discussion, rather than a rate of 0.02 listener responses in 8 minutes of discussion. As a result, comparable rates of each speech act across the conversation are created, rather than rates of each speech act per number of words spoken. Ultimately this produced data that were easier to interpret and enabled the examination of rates of use of LR, O, SI, UI and N speech types by an individual that could be generalized across the sample.

Family and Peer Process Code (FPPC)

The FPPC (Stubbs, Crosby, Forgatch, & Capaldi, 1998), developed by researchers at the Oregon Social Learning Center, codes the contextual and affective features of each conversation to describe the parent's and the adolescent's behaviour in real time. This widely-used coding system captures the initiator and recipient of each behaviour, the content of the behaviour, and the affective quality in which the behaviour is expressed. Twenty-four content codes are divided into verbal, nonverbal, vocal, physical, and compliance behaviours. Because compliant behaviours were not readily observable in the lab discussion task, a minor modification was made to the original scheme in which comply and non-comply codes were omitted, resulting in 22 content codes. Of these 22 content codes, 7 were defined a priori as being positive, 7 were defined as being neutral, and 8 were defined as having a negative impact (see Table 3). An affect rating based on a combination of bodily cues including facial expression, posture, nonverbal gestures and voice inflection was assigned to each content code. The six possible ratings of affect include happy, caring, neutral, distressed, aversive, and sad. Because content and affect are independent dimensions, any affect code can modify any content code. For example, negative content could be coded with a positive affect (e.g., teasing) and positive content could be coded with negative affect (e.g., sarcasm). Content was coded by two trained research assistants who completed approximately two months of training to learn the code and establish reliability. Weekly recalibration meetings were held to minimize drift and ensure coder fidelity. Both research assistants coded a randomly selected 25% of the sample independently. Overall Cohen's kappa for content coding was .72 (Cohen, 1960), which is consistent with minimum guidelines established in the FPPC Coding Manual (Stubbs, et. al., 1998). Affect was coded by three trained research assistants who completed approximately ten hours of training to establish a high degree

of reliability (Cohen's kappas ≥ .70). Coder disagreements regarding affect were resolved using a 'majority rules' system, as has been done in similar studies (e.g., Cole & Rehm, 1986).

Table 3
Content Codes for the FPPC

	POSITIVE	NEUTRAL	NEGATIVE
VERBAL CONTENT	Positive Talk Positive Interpersonal Endearment Advise Agree	Talk Tease Self Disclose Command	Negative Talk Negative Interpersonal Verbal Attack Coerce Refuse
VOCAL CONTENT		Vocal	
NONVERBAL CONTENT	Positive Nonverbal	Neutral Nonverbal	Negative Nonverbal
PHYSICAL CONTENT	Touch/Hold	Physical Interact	Physical Aversive Physical Aggression

Treatment of FPPC Data

To manage the resulting data from the FPPC coding system, three steps were taken. First, affect codes were collapsed into positive (i.e., happy and caring), neutral, and negative (i.e., distressed, aversive, and sad) groupings. Consequently, the resulting coding of 22 content x 3 affect categories yielded a total of 66 possible content/affect behaviour combinations. Second, a system of categorical ratings developed by Snyder, Edwards, McGraw, Kilgore, and Holton (1994) was used. These ratings were originally developed for use with the Family Process Code (Dishion, Gardner, Patterson, Reid, Spyrou, & Thidobeaux, 1983), a precursor to the FPPC which uses the same affect system and most of the same content codes. Slight modifications to the Snyder et al. (1994) categorical ratings were made so that the additional content codes found in the FPPC were included in the continuum (following the precedent set by Neuhaus, Beauchaine, Reid, & Webster-Stratton, in press). These ratings reflect the positive-aversive quality of each behaviour and are placed on a continuum of 0-9, with 0 being the most positive

and 9 reflecting the most aversive. The categorical ratings of the behaviours were then clustered into five categories of interaction: positive interaction (0, 1, 2), neutral interaction (3), low aversive interaction (4, 5), intermediate aversive interaction (6, 7), and high aversive interaction (8, 9) (see Table 4). Third, the five interaction categories were adjusted to capture and control for the frequency of each speaker's use of content/affect within each category across the entire conversation in the same manner as the TCS. The frequency of codes within each category were summed for each speaker and then divided by their total number of coded utterances across the conversation. A constant of the average number of coded utterances assigned to all speakers across the 8-minute conversation in the sample was used (i.e., 147). For instance, if an adolescent had 50 coded utterances that fell within the neutral interaction category and had an overall total of 200 coded utterances within the conversation, the calculated rate without using a constant would be 0.25. However, when this rate is multiplied by the constant of 147 coded utterances, the rate is 36.75. This new rate reflects a *corrected* rate of 36.75 neutral interactions in 8 minutes of discussion, rather than a rate of 0.25 neutral interactions in 8 minutes of discussion. As a result, comparable rates of positive-aversive interactions across the conversation are created, rather than rates of each interaction type per number of codes. As with the TCS, this method produced data that were easier to interpret and enabled the examination of rates of use of positive, neutral, low aversive, intermediate aversive, and high aversive interaction types by an individual that could be generalized across the sample.

Table 4
Examples of Positive-Aversive Categorical Ratings of the FPPC

	Category on Positive-Aversive Continuum	FPPC Content Code	Affective Valence
Positive Interaction	0	positive talk	Positive
	0	positive interpersonal	positive
	0	endearment	positive
	1	talk	positive
	1	agree	positive
	1	touch/hold	positive
	2	command	positive
	2	touch/hold	neutral
	2	physical interact	positive
Neutral Interaction	3	talk	neutral
	3	self disclose	neutral
	3	advise	neutral
	3	command	neutral
	3	neutral nonverbal	positive
Low Aversive Interaction	4	negative talk	positive
	4	tease	positive
	4	vocal	neutral
	5	tease	neutral
	5	verbal attack	positive
	5	physical aversive	positive
Intermediate Aversive Interaction	6	talk	negative
	6	self disclose	negative
	6	negative nonverbal	neutral
	7	negative interpersonal	negative
	7	advise	negative
	7	command	negative
High Aversive Interaction	8	refuse	negative
	8	physical aversive	neutral
	8	physical interact	negative
	9	verbal attack	negative
	9	coerce	negative
	9	physical aggression	negative

Psychophysiological Measures

Respiratory Sinus Arrhythmia (RSA)

RSA is a well-validated measure of PNS activity (Berntson et al., 1997). Parasympathetic linked cardiac activity was assessed from the electrocardiograph signal using spectral analysis. High-frequency heart rate variability (>0.15 Hz) was extracted to index RSA. High-frequency spectral densities were calculated in 30-second epochs using the Medistar Nevrokard software system and normalized through natural log transformations, as is consistent with common practice.

Pre-ejection Period (PEP)

Cardiac activity was monitored continuously during the interaction task by electrocardiographic (ECG) and impedance cardiographic (ICG) signals acquired through an HIC2000 Impedance Cardiograph (Chapel Hill, NC). A spot electrode configuration outlined by Qu, Zhang, Webster, and Tompkins (1986) was used. ECG and ICG signals were ensemble-averaged in 30-second epochs using COP-WIN 5.06 software. PEP was indexed as the time between left-ventricular depolarization, indicated by onset of the ECG Q-wave (Berntson, Lozano, Chen, & Cacioppo, 2004), and the initiation of ejection of blood into the aorta, indicated by the ICG B-wave (Lozano, Norman, Knox, Wood, Miller, Emery, & Berntson, 2007).

Electrodermal Responding (EDR)

Skin conductance was acquired continuously using a Grass 15LT Physiodata Amplifier System and a 15A12 DC amplifier (West Warwick, RI). The signal was collected through two 0.8-cm2 Silver-Silver Chloride electrodes applied to the thenar eminences of the participants' nondominant hands using adhesive collars and Parker Labs Signa Gel (Fairfiled, NJ) as a medium. The signal was recorded in microSiemens (μS) and digitized using Grass PolyVIEW

software. Nonspecific fluctuations in skin conductance responses (SCRs) exceeding 0.05 μS were scored by trained research assistants.

Treatment of Psychophysiological Data

All cardiac and electrodermal data were ensemble-averaged in 30-second epochs to allow for trend analysis between baseline and discussion task conditions. Waveforms were verified or edited prior to analyses. Mean RSA, PEP, HR, and SCR magnitudes were calculated for each 30-second interval for the final two minutes of the 5-minute baseline and for the entire 8-minute discussion task. For baseline measures, cardiac data were not collected for one adolescent and nine mothers and electrodermal data were missing for one adolescent and two mothers due to hardware failure. Excessive movement artifact also rendered RSA data from one adolescent participant unusable. For discussion task measures, cardiac data were not collected for one adolescent and six mothers due to hardware failure and excessive movement artifact rendered HR from one mother and RSA from three mothers unusable. Remaining were 37 adolescents and 29 mothers with calculable cardiac data and 39 adolescents and 38 mothers with calculable electrodermal data. Change scores were calculated for mothers and adolescents on all psychophysiological variables as the difference between the mean of the discussion task and the mean of the baseline. PEP and RSA change scores were then categorized as positive or negative in direction. ANS reactivity profiles were created from a cross tabulation of the positive and negative change scores for RSA and PEP, yielding reciprocal sympathetic activation, reciprocal parasympathetic activation, coinhibition, or coactivation groupings.

Results

Preliminary Analyses

Preliminary analyses were conducted to examine whether the context-specific and autonomic variables of interest differed by the sex of the adolescent or diagnostic groups. First, *t* tests were conducted to test for gender differences. No differences were found. Additionally, the small sample size did not permit an examination of gender differences in patterns of correlations. As such, gender was not considered in further analyses.

Next, a series of one-way Analysis of Variance (ANOVA) was to examine whether there were diagnostic group differences in the context-specific and autonomic variables. Findings revealed significant differences in mother use of positive content, $F(3,39) = 4.63$, $p = .008$, and neutral content, $F(3,39) = 6.05$, $p = .002$, however no differences were found in terms of psychophysiology. The results of these ANOVAs, as well as all others, are reported in Appendices B and C. Follow-up tests were conducted to evaluate pairwise differences among the means using the Scheffé comparison procedures. For both findings, these comparisons revealed a significant difference in the means between the conduct disorder group and the control group, but no significant differences between the means for the comorbid or depressed groups. Clinical groups may have distinct patterns of autonomic responding that differ significantly from one another, but the lack of differentiation between groups reflects the heterogeneity of the sample. As such, diagnostic groups were not considered in further analyses.

Objective 1

The first objective proposed to explore the associations between specific components of content, valence, and conversational style. High-considerateness and high-involvement conversational styles among mothers and adolescents were investigated first. Repeated-measures *t* tests were used to examine if mothers and adolescents differed by rates of conversational

speech acts. As Table 5 details, adolescents utilized each of the conversational speech acts more than mothers and, with the exception of listener responses, were significantly different from mothers in rates of use. This partially replicates previous finding by Beaumont (1995, 2000) in that adolescents more frequently used overlap, successful interruption, unsuccessful complete interruption and unsuccessful incomplete interruption speech acts as is defined by a high-involvement conversational style. However, mothers did not exhibit a use of speech behaviours that would be consistent with a high-considerateness style of speech. Rather, mothers had lower rates of no turn-taking violations and listener responses than adolescents.

Table 5
Results of Pair-sample t-tests for Adolescent and Mother Speech Acts

	M	*(SD)*	*t*	*P*
Adolescent No turn-taking Violations	72.56	(30.05)	5.70	.000**
Mother No turn-taking Violations	42.69	(20.90)		
Adolescent Listener Responses	3.55	(5.93)	1.52	.137
Mother Listener Responses	1.87	(3.74)		
Adolescent Overlaps	3.12	(2.39)	3.85	.000**
Mother Overlaps	1.38	(1.57)		
Adolescent Successful Interruptions	8.36	(9.03)	4.09	.000**
Mother Successful Interruptions	2.15	(2.10)		
Adolescent Unsuccessful Interruptions (Complete)	2.68	(3.64)	3.35	.002**
Mother Unsuccessful Interruptions (Complete)	0.58	(1.01)		
Adolescent Unsuccessful Interruptions (Incomplete)	2.04	(3.10)	2.35	.024*
Mother Unsuccessful Interruptions (Incomplete)	0.80	(1.28)		

Note. *$p < .05$. **$p < .01$.

To further examine conversational styles, correlations were run between mother and adolescent conversational speech acts. Table 6 presents these correlations. Adolescent use of no turn-taking violations was significantly related to mother use of successful interruptions and both complete and incomplete unsuccessful interruptions, whereas mother use of no turn-taking violations was only related to adolescent use of incomplete unsuccessful interruptions.

Table 6
Correlations Between Adolescent and Mother Speech Acts

	Mother N	Mother LR	Mother O	Mother SI	Mother UIC	Mother UII
Adolescent N	.191	-.221	-.307	**-.371***	**-.409****	**-.408****
Adolescent LR	-.065	.006	-.119	-.273	-.234	-.192
Adolescent O	-.096	.114	.007	.154	.129	-.182
Adolescent SI	-.302	-.141	-.248	-.169	-.040	-.049
Adolescent UIC	-.017	-.187	-.200	-.007	-.195	-.142
Adolescent UII	**-.411****	-.225	-.178	-.079	-.152	.023

Note. N = no turn-taking violation, LR = listener response, O = overlap, SI = successful interruption, UIC = unsuccessful interruption (complete), UII = unsuccessful interruption (incomplete).
*$p < .05$. **$p < .01$.

To examine differences of mother and adolescent use of content and valence, repeated-measures *t* tests were used. As Table 7 illustrates, mothers utilized positive content as well as neutral content, valence, and interactions significantly more than adolescents, whereas adolescents utilized more negative valence and aversive interactions than their mothers.

Table 7
Results of Pair-sample t-tests for Adolescent and Mother Content and Valence

	M	*(SD)*	*t*	*P*
Adolescent Positive Content	11.02	(11.22)	-7.29	.000**
Mother Positive Content	32.47	(15.22)		
Adolescent Neutral Content	31.87	(25.78)	-15.61	.000**
Mother Neutral Content	97.52	(18.43)		
Adolescent Neutral Valence	74.39	(32.85)	-3.75	.001**
Mother Neutral Valence	93.61	(22.95)		
Adolescent Negative Valence	45.90	(39.15)	3.83	.000**
Mother Negative Valence	19.76	(24.75)		
Adolescent Neutral Interaction	58.77	(29.96)	-4.41	.000**
Mother Neutral Interaction	78.03	(19.74)		
Adolescent Intermediate Aversive Interaction	49.65	(33.82)	3.70	.001**
Mother Intermediate Aversive Interaction	27.51	(23.71)		
Adolescent High Aversive Interaction	2.51	(4.10)	2.60	.013*
Mother High Aversive Interaction	0.81	(2.57)		

Note. *$p < .05$. **$p < .01$.

The significant differences that the *t*-tests revealed between mother and adolescent use of positive content and neutral content, valence, and interactions suggest an adaptive pattern mothers use that is generally associated with adolescent neutrality. To further investigate these differences, correlations were run to examine the associations between adolescent and mother use of content and valence (see Table 8). Correlations showed mother use of neutral content was accompanied by adolescent use of neutral content. When mothers used neutral valence, adolescents were more likely to use neutral valence as well and were less likely to use a high aversive interaction. Similarly, mother neutral interactions were also associated with a decreased likelihood of adolescent use of high aversive interactions and were linked with adolescent neutral valence and interactions. Negative content, which *t*-tests revealed mothers did not use significantly more frequently than adolescents, was less likely to be associated with adolescent neutral valence and interactions. In contrast, the significant difference shown by *t*-tests between adolescent and mother use of negative valence and aversive interactions hints at a maladaptive pattern used by adolescents that is generally linked to negativity. To exemplify, correlations indicated that adolescent negative valence was associated with mother negative content and high aversive interactions were associated with mother negative valence and intermediate aversive interactions.

Table 8

Correlations Between Adolescent and Mother Content and Valence

		Mother										
		Positive Content	Neutral Content	Negative Content	Positive Valence	Neutral Valence	Negative Valence	Positive Interaction	Neutral Interaction	Low Aversive Interaction	Intermediate Aversive Interaction	High Aversive Interaction
Adolescent	Positive Content	.033	.076	-.153	.212	-.087	-.073	.302	-.065	-.082	-.120	-.154
	Neutral Content	**-.379***	**.313***	.000	.004	-.038	.032	-.018	-.107	.205	.038	-.005
	Negative Content	-.276	.096	.196	.213	-.031	-.126	.140	-.119	.144	-.054	.050
	Positive Valence	-.108	.103	-.021	.282	-.194	-.024	.218	-.233	.300	-.063	.042
	Neutral Valence	-.030	.290	**-.393***	-.251	**.366***	-.158	-.111	**.370***	.075	-.240	-.116
	Negative Valence	.089	-.304	**.342***	.044	-.193	.147	-.035	-.173	-.240	.238	.073
	Positive Interaction	-.080	.079	-.018	.282	-.203	-.015	.219	-.232	.261	-.051	.028
	Neutral Interaction	-.018	.260	**-.363***	-.267	.301	-.086	-.126	**.333***	.020	-.186	-.057
	Low Aversive Interaction	.106	.055	-.211	.079	.006	-.062	.135	-.008	.049	-.093	-.114
	Intermediate Aversive Interaction	.061	-.275	**.333***	-.016	-.047	.055	-.097	-.056	-.180	.171	.027
	High Aversive Interaction	-.239	.010	.278	.207	**-.540****	**.352***	.144	**-.495****	-.136	**.320***	.298

Note. *$p < .05$. **$p < .01$.

Finally, to examine associations between content and valence and individual conversational style speech acts, correlations were computed between mother and adolescent individual conversation style speech acts and mother and adolescent content and valence. Within-mother correlations (see Table 9) showed that high-considerateness speech acts of no turn-taking violations was accompanied by lower positive content and higher neutral content, but listener responses were linked to higher low aversive interactions. High-involvement speech acts of successful interruptions were associated with lower positive content, valence and interaction, whereas overlaps were accompanied by lower positive content and higher neutral content.

Table 9
Correlations Between Mother Speech Acts, Content, and Valence

	N	LR	O	SI	UIC	UII
Positive Content	**-.604****	-.126	**-.414****	**-.396***	-.114	-.012
Neutral Content	**.575****	.231	**.417****	.294	-.040	-.064
Negative Content	-.113	-.187	-.112	.050	.199	.109
Positive Valence	-.022	.105	.186	**-.341***	-.109	-.026
Neutral Valence	-.148	.226	.005	.001	.114	-.049
Negative Valence	.153	-.285	-.139	.245	-.026	.065
Positive Interaction	-.007	.115	.189	**-.332***	-.122	-.030
Neutral Interaction	-.178	.035	-.058	-.024	-.012	-.063
Low Aversive Interaction	.212	**.620****	.169	.024	.057	-.072
Intermediate Aversive Interaction	.060	-.293	-.118	.252	.085	.114
High Aversive Interaction	.230	-.156	-.216	-.004	-.052	-.158

Note. N = no turn-taking violation, LR = listener response, O = overlap, SI = successful interruption, UIC = unsuccessful interruption (complete), UII = unsuccessful interruption (incomplete).
*$p < .05$. **$p < .01$.

Within-adolescent correlations (Table 10) revealed a different pattern of associations between content and valence and speech acts for adolescents than mothers. Only one high-involvement speech act was associated with content and valence for adolescents. Successful interruptions tend to be accompanied by lower neutral valence and interactions and higher levels of negative valence and intermediate aversive interactions. The high-considerateness speech act of listener responses were associated with lower negative content, intermediate aversive

interactions, and higher neutral valence. Like mothers, adolescent use of listener responses also was accompanied by low aversive interactions. Additionally, no turn-taking acts of speech were linked to lower levels of negative content.

Table 10
Correlations Between Adolescent Speech Acts, Content, and Valence

	N	LR	O	SI	UIC	UII
Positive Content	-.149	-.047	.129	.066	-.074	.170
Neutral Content	.104	.084	.124	-.178	-.079	-.192
Negative Content	**-.430****	**-.387***	.040	.043	.002	-.291
Positive Valence	.078	.026	.108	-.200	-.113	-.187
Neutral Valence	.060	**.334***	-.220	**-.376***	-.240	-.179
Negative Valence	-.096	-.296	.121	**.433****	.268	.260
Positive Interaction	.113	.024	.112	-.178	-.105	-.171
Neutral Interaction	.065	.156	-.204	**-.372***	-.203	-.062
Low Aversive Interaction	.298	**.794****	-.068	-.053	-.056	-.127
Intermediate Aversive Interaction	-.227	**-.356***	.131	**.421****	.213	.193
High Aversive Interaction	.102	-.233	-.157	.044	.268	.035

Note. N = no turn-taking violation, LR = listener response, O = overlap, SI = successful interruption, UIC = unsuccessful interruption (complete), UII = unsuccessful interruption (incomplete).
*$p < .05$. **$p < .01$.

Correlations between mother speech acts and adolescent content and valence (Table 11) showed that, of the significant correlations, most of mother speech acts were associated with adolescent content. Mothers were more likely to use a listener response when adolescents used positive content, more likely to use a successful interruption or a non-violation of turn-taking when adolescents used neutral content and were more likely to overlap or unsuccessfully interrupt when adolescents used negative content. Mother use of no turn-taking violations also tended to occur when adolescents used positive valence or interactions, whereas use of a listener response was less likely to occur when adolescents used negative valence.

Table 11
Correlations Between Mother Speech Acts and Adolescent Content and Valence

		Mother					
		N	LR	O	SI	UIC	UII
Adolescent	Positive Content	-.043	**.515****	.191	.082	.116	.137
	Neutral Content	**.583****	.087	.219	**.383***	.306	-.134
	Negative Content	.027	-.010	**.413****	.194	.310	**.398***
	Positive Valence	**.351***	.129	-.091	-.144	.034	-.108
	Neutral Valence	.034	.294	-.175	.005	-.081	-.061
	Negative Valence	-.236	**-.323***	.200	.081	.048	.115
	Positive Interaction	**.331***	.100	-.160	-.193	-.014	-.121
	Neutral Interaction	.015	.221	-.156	.020	-.071	-.116
	Low Aversive Interaction	.077	.174	-.028	-.115	-.152	-.083
	Intermediate Aversive Interaction	-.268	-.276	.212	.144	.117	.202
	High Aversive Interaction	.186	-.144	.188	-.022	-.039	-.058

Note. N = no turn-taking violation, LR = listener response, O = overlap, SI = successful interruption, UIC = unsuccessful interruption (complete), UII = unsuccessful interruption (incomplete).
*$p < .05$. **$p < .01$.

In contrast to mothers, the relationships between adolescent speech acts and mother content and valence were largely centered around adolescent use of a high-involvement style (see Table 12). Adolescent successful interruptions and unsuccessful incomplete interruptions were quite similar in that both were more likely to occur when mothers used positive content and were less likely to occur with neutral content. Additionally, unsuccessful incomplete interruptions were also less likely to occur with mother use of low aversive interactions. Showing an opposite pattern, use of unsuccessful complete interruptions were associated with mother use of negative content and valence as well as intermediate aversive interactions, but were less likely to occur when mothers used neutral valence and interactions. Adolescent no turn-taking violations were also less likely to occur when mothers used negative content.

Table 12
Correlations Between Adolescent Speech Acts and Mother Content and Valence

		Adolescent					
		N	LR	O	SI	UIC	UII
Mother	Positive Content	.075	.170	.229	**.490****	.003	**.416****
	Neutral Content	.154	.042	-.165	**-.471****	-.297	**-.392***
	Negative Content	**-.320***	-.270	-.035	.099	**.437****	.071
	Positive Valence	.102	.122	.185	.124	-.013	-.308
	Neutral Valence	.003	.083	.084	-.002	**-.369***	.050
	Negative Valence	-.077	-.165	-.211	-.088	**.351***	.177
	Positive Interaction	.162	.195	.108	.062	-.115	-.291
	Neutral Interaction	.090	.111	.077	.013	**-.365***	.185
	Low Aversive Interaction	-.087	-.106	.117	-.044	.020	**-.317***
	Intermediate Aversive Interaction	-.159	-.189	-.160	-.036	**.355***	.154
	High Aversive Interaction	-.046	-.094	-.179	-.052	.238	.023

Note. N = no turn-taking violation, LR = listener response, O = overlap, SI = successful interruption, UIC = unsuccessful interruption (complete), UII = unsuccessful interruption (incomplete).
*$p < .05$. **$p < .01$.

Objective 2

The second objective was to examine the correspondence of autonomic responding of parent-adolescent dyads and the observed context-specific components observed during the discussion task by utilizing autonomic response profiles. To begin, mean change scores were calculated as the difference in discussion task responses from baseline responses for each of the physiological variables (see Table 13). To examine mean change scores prior to grouping by autonomic responding profile, *t* tests were conducted to test for differences between adolescents and mothers. No differences were found.

Table 13
Adolescent and Mother Physiological Mean Change

	Adolescent			Mother		
	n	*M*	*SD*	*n*	*M*	*SD*
RSA (log[beats/min^2/Hz])	37	-0.09	0.70	30	-0.05	0.65
PEP (milliseconds)	38	-0.38	4.00	31	0.13	3.35
HR (beats/min)	38	3.32	4.25	30	3.08	3.95
SCR (nonspecific fluctuations)	39	1.33	2.34	38	0.84	1.23

Correlations were then run to examine the relationships between individual psychophysiological measures and context-specific variables for adolescents and mothers (see Tables 14 and 15). As a group, adolescent physiological responding showed a pattern of reciprocal sympathetic responding. Mean change scores reflected a decrease in RSA, shortened PEP, increased HR, and increased SCR, each indicating increased arousal during the discussion task. Positive correlations with each of these measures are associated with autonomic arousal. In broad terms, these correlations revealed that the observed physiological changes are associated with a decrease in adolescent use of positive content, valence, and interaction as well as increases in mother use of unsuccessful incomplete interruptions and high aversive interactions and a decrease in mother use of successful interruptions. In particular, a decrease in RSA was associated with mother use of unsuccessful incomplete interruptions and high aversive interactions. Decreased PEP was negatively associated with adolescent use of positive content and mother use of successful interruptions, but positively associated with mother use of high aversive interactions. Increased HR was negatively associated with adolescent use of positive valence and interactions, whereas increased SCR showed no significant relationships with either mother or adolescent context-specific variables.

Mothers, as a group, showed a mixed physiological response pattern most closely resembling coinhibition. RSA, HR, and SCR mean change scores increased, thus positive correlations with these measures will be associated with arousal. However, PEP mean change scores decreased which is indicative of parasympathetic responding or soothing. Positive correlations with PEP are associated with autonomic calming. Specifically, RSA was positively associated with mother use of unsuccessful incomplete interruptions and negative content and negatively associated with neutral content. HR was negatively associated with adolescent use of unsuccessful incomplete interruptions. SCR was positively linked with mother use of negative

content and adolescent use of negative valence and intermediate high aversive interactions and negatively associated with adolescent use of neutral valence and neutral interactions. PEP was positively correlated with adolescent use of positive interaction, but was negatively correlated with adolescent use of negative valence and intermediate aversive interactions as well as mother use of negative valence.

Table 14
Correlations Between Physiological Mean Change and Adolescent Context-Specific Variables

	Adolescent				Mother			
	RSA Δ -.09 (*n* = 37)	PEP Δ -.38 (*n* = 38)	HR Δ +3.32 (*n* = 38)	SCR Δ +1.33 (*n* = 39)	RSA Δ -.05 (*n* = 30)	PEP Δ +.13 (*n* = 31)	HR Δ +3.08 (*n* = 30)	SCR Δ +.84 (*n* = 38)
Adolescent								
Conversational Style								
N	-.171	.134	-.009	-.017	.005	.063	-.261	-.317
LR	-.102	.107	-.025	.187	-.113	.285	.324	-.139
O	.120	-.260	.078	-.018	.093	-.003	-.051	.143
SI	-.028	-.212	.055	-.041	.045	.006	.130	.129
UIC	-.220	-.155	.166	-.032	.292	-.245	**-.373***	-.039
UII	-.152	.046	-.042	.017	.256	-.246	.083	-.017
Content and Valence								
Positive Content	-.158	**-.465****	-.036	.024	.322	.077	-.108	.079
Neutral Content	.292	-.167	-.086	.061	-.032	.141	.024	.151
Negative Content	.281	-.088	.178	.048	.055	-.212	-.099	.152
Positive Valence	.149	-.067	**-.325***	-.164	-.326	.318	-.343	-.110
Neutral Valence	-.207	.075	.022	.134	-.190	.287	-.073	**-.362***
Negative Valence	.087	-.023	.173	-.016	.302	**-.376***	.213	**.361***
Positive Interaction	.133	-.097	**-.378***	-.183	-.325	**.357***	-.341	-.114
Neutral Interaction	-.186	.136	-.009	.102	-.143	.181	-.107	**-.342***
Low Aversive Interaction	-.137	-.021	.099	.197	-.098	.313	.323	-.113
Intermediate Aversive Interaction	.080	-.047	.218	-.017	.295	**-.384***	.202	**.352***
High Aversive Interaction	.221	.036	.015	-.073	.146	-.208	-.098	.164

Note. RSA = Respiratory sinus arrhythmia (log[beats/min^2/Hz]), PEP = pre-ejection period (ms), HR = heart rate (beats/min), SCR = skin conductance response (nonspecific fluctuations), N = no turn-taking violation, LR = listener response, O = overlap, SI = successful interruption, UIC = unsuccessful interruption (complete), UII = unsuccessful interruption (incomplete).
*$p < .05$. **$p < .01$.

Table 15
Correlations Between Physiological Mean Change and Mother Context-Specific Variables

	Adolescent				Mother			
	RSA Δ -.09 (*n* = 37)	PEP Δ -.38 (*n* = 38)	HR Δ +3.32 (*n* = 38)	SCR Δ +1.33 (*n* = 39)	RSA Δ -.05 (*n* = 30)	PEP Δ +.13 (*n* = 31)	HR Δ +3.08 (*n* = 30)	SCR Δ +.84 (*n* = 38)
Mother								
Conversational Style								
N	.238	-.215	-.113	.007	-.131	-.071	-.291	.069
LR	-.154	-.219	.195	.113	.049	.211	-.076	.122
O	.141	-.238	.145	.093	-.049	-.146	.252	.123
SI	.114	**-.380***	.145	-.094	.121	-.293	.074	.293
UIC	**.369***	-.267	-.037	-.085	**.533****	-.099	-.098	.021
UII	.132	-.238	.051	.237	.235	-.171	-.015	.107
Content and Valence								
Positive Content	.000	.004	-.261	.269	.147	.064	.152	-.025
Neutral Content	-.054	-.142	.172	-.095	**-.395***	.105	-.070	-.238
Negative Content	.079	.200	.066	-.184	**.437***	-.244	-.085	**.377***
Positive Valence	.031	-.103	-.126	.157	-.221	.213	.111	-.034
Neutral Valence	-.117	.011	.184	.171	-.102	.236	.026	-.204
Negative Valence	.085	.064	-.077	-.272	.258	**-.386***	-.103	.212
Positive Interaction	.032	-.130	-.163	.216	-.221	.243	.075	-.090
Neutral Interaction	-.087	-.038	.071	.137	-.137	.176	.060	-.299
Low Aversive Interaction	-.150	.094	.252	.084	-.228	.125	-.045	.071
Intermediate Aversive Interaction	.053	.058	.003	-.284	.326	-.349	-.066	.275
High Aversive Interaction	**.396***	**.344***	-.237	-.090	.236	-.191	-.215	.155

Note. RSA = Respiratory sinus arrhythmia (log[beats/min^2/Hz]), PEP = pre-ejection period (ms), HR = heart rate (beats/min), SCR = skin conductance response (nonspecific fluctuations), N = no turn-taking violation, LR = listener response, O = overlap, SI = successful interruption, UIC = unsuccessful interruption (complete), UII = unsuccessful interruption (incomplete).
*$p < .05$. **$p < .01$.

Next, mothers and adolescents were grouped by autonomic response pattern as described in the methodology. Descriptive statistics for the final groupings appear in Table 16. It should be noted that the reciprocal sympathetic and reciprocal parasympathetic ANS profile groups for mothers yielded only 3 and 4 subjects, respectively. Relatively equal groupings of participants in each of the ANS profile groups were not and should not be expected. Other studies utilizing the

same grouping methodology (e.g., Alkon et al., 2003; Salomon et al., 2000; Pearson, Alkon, Treadwell, Wolff, Quirolo, & Boyce, 2005) have encountered similar patterns of varied distributions. Furthermore, the ratios obtained here for mothers appear to be reflective of adult patterns of responding (Alkon et al., 2003). However, caution should be taken in interpreting results of between-group comparisons.

Table 16
Adolescent and Mother ANS Profiles

	Autonomic Nervous System		Adolescents		Mothers	
ANS Profile	SNS	PNS	*n*	%	*n*	%
Reciprocal Sympathetic Activation	+	–	11	30	3	10
Reciprocal Parasympathetic Activation	–	+	8	22	4	14
Coactivation	+	+	9	24	8	28
Coinhibition	–	–	9	24	14	48
Total			37	100	29	100

A series of one-way ANOVAs were then used to examine ANS response profile group differences in mean change scores for each of the autonomic variables. Table 17 presents the means, *F* values, and significance for these ANOVAs. Post hoc analyses using the Scheffé post hoc criterion for significance indicated that, for adolescents, there was a significant difference in group means for RSA, PEP, and HR, but no significant differences between group means for SCR. Mothers also showed significant differences in group means for RSA and PEP. Group differences in RSA and PEP for mothers and adolescents were expected, due to the grouping criteria. That no group differences in SCR were found was also somewhat expected given that skin conductance was not part of the ANS profile grouping criteria.

Table 17
ANOVA Results for Psychophysiological Mean Change by ANS Profile

	Reciprocal Sympathetic		Reciprocal Parasympathetic		Coactivation		Coinhibition			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	$F^{a,b}$	*p*
Adolescent										
RSA Δ	-0.53	0.32	0.51[c]	0.43	0.50[c]	0.43	-0.66[d,e]	0.61	18.07	.000
PEP Δ	-2.46	2.07	3.77[c]	2.46	-4.45[d]	3.48	2.28[c,e]	1.44	22.05	.000
HR Δ	5.58	3.56	1.93[c]	3.74	-0.47[c]	3.58	5.08[c]	3.52	5.89	.002
SCR Δ	1.94	2.49	1.54	2.40	1.34	2.18	1.12	1.87	0.23	.876
Mother										
RSA Δ	-0.16	0.19	0.61	0.64	0.58[c]	0.37	-0.55[d,e]	0.37	17.35	.000
PEP Δ	-3.72	3.12	2.08[c]	2.14	-2.73[d]	1.50	2.53[c,e]	2.14	15.73	.000
HR Δ	2.78	3.50	4.92	6.05	0.90	3.32	3.85	3.81	1.250	.313
SCR Δ	-0.79	2.78	0.97	1.29	1.26	1.18	0.97	0.94	1.919	.155

Note. RSA = Respiratory sinus arrhythmia (log[beats/min^2/Hz]), PEP = pre-ejection period (ms), HR = heart rate beats/min), SCR = skin conductance response (nonspecific fluctuations).
[a] Degrees of freedom for adolescents was 3,36
[b] Degrees of freedom for mothers was 3,28
[c] Differed from reciprocal sympathetic at $p < .01$.
[d] Differed from reciprocal parasympathetic at $p < .01$.
[e] Differed from coactivation at $p < .01$.

Next, a series of one-way ANOVAs was used to examine whether there were ANS profile group differences in the context-specific variables. Examination of the ANS groupings revealed significant differences for mothers in their use of neutral content $F(3,28) = 5.45$, $p = .005$. The results of this significant ANOVAs, as well as all non-significant ANOVA findings for ANS profile groups, are reported in Tables 18, 19, 20, and 21. Scheffé post hoc analyses revealed the means of mother use of neutral content for mother reciprocal sympathetic responders were significantly higher than for the coactivation ANS profile group.

Table 18

ANOVA Results for Mother Context-Specific Variables by Mother ANS Profile

Mother Variables	Reciprocal Sympathetic		Reciprocal Parasympathetic		Coactivation		Coinhibition			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*[a]	*p*
Conversational Style										
N	56.07	(33.02)	37.14	(15.11)	41.20	(29.35)	40.38	(17.37)	0.47	.703
LR	1.22	(1.07)	4.54	(7.98)	0.11	(0.30)	2.36	(4.40)	1.08	.374
O	2.03	(1.25)	2.06	(1.69)	1.26	(1.30)	1.30	(1.91)	0.36	.784
SI	3.71	(0.95)	3.40	(1.67)	2.43	(2.90)	1.81	(2.02)	0.96	.426
UIC	0.56	(0.98)	1.40	(1.25)	1.08	(1.51)	0.07	(0.25)	2.98	.051
UII	0.74	(0.69)	0.65	(1.30)	1.38	(2.24)	0.66	(0.96)	0.47	.705
Content and Valence										
Positive Content	16.31	(5.56)	26.68	(18.34)	40.53	(17.66)	32.68	(14.90)	1.95	.147
Neutral Content	123.60[b]	(11.49)	104.28	(22.58)	81.25	(13.49)	101.46	(17.23)	5.45	**.005**
Negative Content	9.09	(8.07)	18.04	(11.31)	27.22	(16.17)	14.87	(8.70)	2.64	.071
Positive Valence	27.87	(9.66)	33.54	(11.64)	30.04	(20.90)	38.69	(16.70)	0.62	.609
Neutral Valence	108.89	(13.94)	97.24	(17.25)	88.82	(29.20)	101.64	(18.63)	0.86	.474
Negative Valence	12.25	(21.21)	18.22	(13.20)	30.14	(33.62)	8.67	(12.63)	1.76	.180
Positive Interaction	26.04	(9.05)	35.82	(13.35)	28.48	(18.59)	38.41	(15.55)	0.96	.428
Neutral Interaction	95.69	(12.17)	82.27	(9.93)	74.81	(29.00)	83.52	(15.55)	0.87	.469
Low Aversive Interaction	10.21	(6.10)	3.91	(4.56)	4.09	(5.32)	9.34	(10.01)	1.08	.376
Intermediate Aversive Interaction	17.05	(25.89)	26.70	(14.56)	39.45	(30.20)	17.62	(14.60)	1.97	.144
High Aversive Interaction	0.00	(0.00)	0.31	(0.61)	2.18	(4.74)	0.11	(0.43)	1.26	.309

Note. N = no turn-taking violation, LR = listener response, O = overlap, SI = successful interruption, UIC = unsuccessful interruption (complete), UII = unsuccessful interruption (incomplete).

[a] Degrees of freedom were 3,28

[b] Differed from coactivation at $p < .01$.

Table 19

ANOVA Results for Adolescent Context-Specific Variables by Mother ANS Profile

Adolescent Variables	Reciprocal Sympathetic		Reciprocal Parasympathetic		Coactivation		Coinhibition			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	F^a	*p*
Conversational Style										
N	61.45	(21.01)	74.98	(54.44)	70.55	(29.39)	65.59	(17.48)	0.19	.901
LR	1.41	(1.45)	2.08	(1.88)	1.92	(3.58)	3.92	(7.39)	0.32	.808
O	3.59	(1.71)	2.92	(2.05)	3.46	(2.93)	3.09	(2.81)	0.07	.977
SI	8.07	(3.26)	4.46	(2.42)	12.15	(6.76)	8.08	(13.61)	0.52	.671
UIC	0.58	(1.01)	2.14	(3.67)	4.86	(6.30)	1.76	(1.95)	1.44	.256
UII	0.45	(0.77)	1.96	(1.62)	4.51	(5.57)	0.75	(1.01)	2.76	.063
Content and Valence										
Positive Content	4.98	(2.57)	20.93	(26.72)	8.20	(7.43)	9.03	(6.91)	1.56	.223
Neutral Content	44.24	(34.43)	42.65	(54.72)	24.77	(21.79)	24.27	(15.26)	0.89	.458
Negative Content	25.43	(14.53)	16.10	(11.85)	27.53	(17.29)	25.61	(17.32)	0.45	.716
Positive Valence	25.41	(23.95)	11.04	(7.15)	16.04	(15.75)	28.06	(16.21)	1.70	.193
Neutral Valence	80.04	(40.22)	84.55	(33.21)	50.14	(18.01)	79.86	(37.39)	1.70	.192
Negative Valence	43.54	(62.65)	53.41	(37.99)	82.82	(28.04)	41.08	(39.56)	2.04	.134
Positive Interaction	23.30	(22.58)	11.91	(4.96)	15.97	(16.30)	27.90	(14.97)	1.69	.195
Neutral Interaction	64.26	(28.93)	71.93	(26.22)	43.72	(15.77)	61.13	(33.65)	1.10	.368
Low Aversive Interaction	5.27	(4.85)	7.03	(6.18)	4.83	(2.60)	9.63	(10.52)	0.69	.567
Intermediate Aversive Interaction	55.52	(55.19)	54.63	(27.18)	79.66	(24.03)	48.30	(31.30)	1.70	.192
High Aversive Interaction	0.64	(1.10)	3.52	(7.03)	4.82	(4.61)	2.04	(3.63)	1.00	.407

Note. N = no turn-taking violation, LR = listener response, O = overlap, SI = successful interruption, UIC = unsuccessful interruption (complete), UII = unsuccessful interruption (incomplete).

[a] Degrees of freedom were 3,28

Table 20

ANOVA Results for Adolescent Context-Specific Variables by Adolescent ANS Profile

	Reciprocal Sympathetic		Reciprocal Parasympathetic		Coactivation		Coinhibition			
Adolescent Variables	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	F^a	*p*
Conversational Style										
N	76.28	(37.82)	62.28	(15.06)	62.62	(25.35)	73.99	(24.22)	0.65	.586
LR	4.12	(5.16)	1.54	(2.51)	1.82	(2.95)	4.23	(6.18)	0.92	.444
O	4.11	(2.46)	1.97	(2.19)	3.51	(1.58)	2.70	(2.27)	1.71	.185
SI	13.11	(14.63)	5.75	(3.02)	7.90	(4.95)	6.57	(6.97)	1.30	.290
UIC	4.65	(5.16)	2.30	(3.40)	1.76	(1.49)	1.39	(2.58)	1.75	.177
UII	2.09	(2.12)	1.78	(2.41)	1.65	(1.60)	3.28	(5.49)	0.47	.707
Content and Valence										
Positive Content	16.14	(15.92)	4.45	(4.38)	14.67	(12.24)	8.47	(4.39)	2.21	.106
Neutral Content	26.88	(23.08)	33.61	(40.12)	46.37	(22.77)	23.96	(16.16)	1.32	.284
Negative Content	23.51	(16.37)	28.10	(16.11)	27.37	(17.06)	13.79	(10.92)	1.62	.203
Positive Valence	22.01	(19.11)	27.54	(20.15)	44.39	(30.78)	25.45	(17.21)	1.87	.154
Neutral Valence	76.48	(37.60)	71.31	(26.09)	59.09	(30.25)	90.51	(33.65)	1.42	.253
Negative Valence	50.51	(45.50)	50.14	(34.70)	45.52	(42.68)	33.03	(35.55)	0.38	.771
Positive Interaction	23.84	(17.50)	26.21	(19.09)	43.00	(29.67)	24.01	(14.00)	1.81	.164
Neutral Interaction	56.99	(28.57)	60.78	(26.74)	46.82	(23.09)	73.87	(29.34)	1.53	.224
Low Aversive Interaction	10.51	(7.31)	4.16	(2.73)	8.01	(3.76)	12.82	(15.69)	1.45	.245
Intermediate Aversive Interaction	56.14	(38.96)	54.93	(29.72)	47.57	(36.65)	36.75	(31.99)	0.60	.617
High Aversive Interaction	1.52	(2.12)	2.93	(5.42)	3.60	(4.78)	1.55	(2.39)	0.69	.565

Note. N = no turn-taking violation, LR = listener response, O = overlap, SI = successful interruption, UIC = unsuccessful interruption (complete), UII = unsuccessful interruption (incomplete).

[a] Degrees of freedom were 3,36

Table 21

ANOVA Results for Mother Context-Specific Variables by Adolescent ANS Profile

Mother Variables	Reciprocal Sympathetic		Reciprocal Parasympathetic		Coactivation		Coinhibition			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	F^a	*p*
Conversational Style										
N	36.09	(17.04)	39.11	(28.85)	56.95	(17.34)	37.98	(19.39)	2.03	.129
LR	2.88	(5.35)	0.32	(0.63)	1.74	(1.85)	2.43	(4.88)	0.72	.547
O	1.23	(1.22)	1.05	(1.46)	2.09	(2.19)	1.22	(1.55)	0.75	.532
SI	2.39	(2.23)	1.69	(1.78)	2.94	(2.62)	1.96	(1.91)	0.55	.654
UIC	0.32	(0.81)	0.89	(1.07)	1.05	(1.38)	0.33	(0.77)	1.27	.299
UII	0.96	(1.11)	1.04	(2.24)	1.30	(0.95)	0.16	(0.34)	1.28	.297
Content and Valence										
Positive Content	34.14	(13.82)	33.32	(18.09)	28.18	(11.65)	36.83	(18.99)	0.48	.700
Neutral Content	96.48	(20.40)	86.25	(11.45)	103.64	(20.23)	96.91	(17.22)	1.33	.281
Negative Content	18.38	(11.19)	29.44	(11.65)	17.18	(12.37)	15.26	(12.87)	2.34	.091
Positive Valence	36.35	(19.31)	32.43	(16.85)	41.52	(22.04)	31.07	(16.18)	0.55	.651
Neutral Valence	95.73	(16.51)	86.75	(28.28)	86.50	(28.73)	102.17	(19.32)	0.94	.432
Negative Valence	16.92	(23.77)	29.82	(37.31)	20.99	(23.60)	15.76	(17.37)	0.51	.676
Positive Interaction	35.71	(16.54)	31.94	(15.75)	39.49	(21.08)	31.44	(18.60)	0.38	.767
Neutral Interaction	78.42	(16.28)	69.23	(19.96)	73.75	(25.15)	86.27	(17.63)	1.16	.339
Low Aversive Interaction	8.31	(6.94)	6.56	(6.09)	7.78	(5.00)	8.53	(12.31)	0.10	.958
Intermediate Aversive Interaction	26.57	(22.76)	37.22	(28.89)	27.98	(26.93)	22.76	(20.96)	0.51	.677
High Aversive Interaction	0.00	(0.00)	4.05	(4.65)	0.00	(0.00)	0.00	(0.00)	7.47	1.00

Note. N = no turn-taking violation, LR = listener response, O = overlap, SI = successful interruption, UIC = unsuccessful interruption (complete), UII = unsuccessful interruption (incomplete).

[a] Degrees of freedom were 3,36

Discussion

In this study, contextual and autonomic correlates of parent-child conflict were explored using two major objectives as an organizational framework. The first objective of this study was to examine the context-specific components of content, valence, and conversational style. The second objective was to examine the correspondence of autonomic responding of parent-adolescent dyads and the context-specific components observed during the conflict resolution task.

Objective 1

Conversational Styles

It was first hypothesized that mothers would tend to exhibit a high-considerateness conversational style and adolescents would tend to exhibit a high-involvement conversational style as evidenced by frequency of use of the corresponding speech acts for each conversational style, thereby replicating findings by Beaumont (1995, 2000). Although adolescents utilized each of the high-involvement speech acts more than mothers, they also used each of the high-considerateness speech acts more than mothers. When these rates of use are considered alone, they indicate only partial support for the hypothesis. However, relationships between mother and adolescent speech acts reveal otherwise.

Systematic Associations Among Conversational Speech Acts

In general, most conversational speech acts by mothers and adolescents were not systematically related. However, the relationship between no turn-taking violations of conversation by both mothers and adolescents with simultaneous speech acts are indicative of style uses proposed by Tannen (1984). Adolescent use of no turn-taking violations was related to mother use of successful interruptions and both complete and incomplete unsuccessful interruptions, whereas mother use of no turn-taking violations was only related to adolescent use

of incomplete unsuccessful interruptions. These relationships indicate that even though mothers do not utilize specific high-considerateness speech styles more frequently than adolescents as found by Beaumont (1995, 2000), they may be less likely to use acts of simultaneous speech when adolescents are not violating their turn in conversation. This reflects the high-considerateness pattern described by Tannen (1984), in that mothers avoid simultaneous speech so as to not impose on adolescent speech. For adolescents, only unsuccessful incomplete interruptions were related to mother use of no turn-taking violations. This indicates that adolescents may perseverate in simultaneous speech acts regardless of mother use of non-imposing speech acts, which is characteristic of a high-involvement conversational style. According to Tannen (1984) this characteristic serves to help adolescents build conversational involvement with their mothers. These findings reveal that, in this sample, conversational styles are not demonstrated by rates of use of speech acts alone, but are also demonstrated by how speech acts are related between speakers. Thus, it may be the rate at which adolescents and mothers use speech acts as well as how they use speech acts that contributes to an overall style.

Systematic Associations Between Content, Valence, and Conversational Speech Acts

Gottman (1979) found that married couples in distress were more likely to counter an aversive behaviour with a similar negative or aversive behaviour. Similar to the findings from marital conflict literature, mothers and adolescents in the present study tended to use negative conversational behaviours in a reciprocal fashion when engaged in a conflict discussion. However, neutral behaviours also tended to be reciprocal in nature. Moreover, the tendencies for both negative and neutral conversational behaviours were not limited to affect; use of content was also shown to reciprocate similar content. Intuitively, negative and neutral behaviors were also found to have opposing effects. That is, uses of negative conversation elements are less likely to be associated with uses of neutral conversation elements and vice versa. Indeed, it

appears that like behaviour may be associated like behaviour. Of particular importance in these findings, however, is that mothers and adolescents in this sample were shown to have associations with matching content. Relatively little is known about the role content plays in parent-adolescent conflicts, and these results indicate that content alone may impact how parents and adolescents respond to one another.

Results from this study indicated that mothers and adolescents in this sample do indeed differ in their amount of content and valence use and correlations revealed multiple associations between content, valence and conversational speech acts. Alone, these findings provide insight into how context-specific variables are associated with one another. However, when these results are considered as a whole, patterns emerge that illustrate the differences between mother and adolescent use of content and valence in a more meaningful way. Snyder (1994) found that mothers of nonaggressive children continuously worked to de-escalate conflict at all levels of child aversiveness and were more able to soothe their child or reduce ambient arousal. Not only do results from this study support these findings, they provide insight into how mothers may work toward de-escalation or avoidance of conflict with their adolescents. For mothers, positive content and neutral content, valence, and interactions were found to be used more frequently. Although these uses were generally associated with maintaining adolescent neutrality, distinct patterns emerged in how mother use of content and valence operate in slightly different ways during conflict. Mother use of positive content was negatively associated with mother use of high-involvement speech acts and positively associated with adolescent use of high-involvement speech acts. However, mother use of neutral content showed an opposing pattern of positive associations with mother use of high-involvement speech acts and negative associations with adolescent use of high-involvement speech acts. Thus, while uses of both positive and neutral content appear to facilitate adaptive communication, positive content appears to elicit rapport

and involvement from adolescents and neutral content appears to elicits rapport and involvement from mothers. On the other hand, mother use of neutral valence and neutral interactions had identical patterns which were accompanied by adolescent neutral valence and negatively associated with adolescent use of high aversive interactions and unsuccessful complete interruptions. Overall, findings indicate that mothers in the present study adaptively utilize content and valence as part of a complex process that appears to function to maintain adolescent neutrality and conversational engagement.

Adolescents, however, were found to use negative valence, intermediate aversive, and high aversive interactions more frequently than mothers. Yet, these uses were not associated with positive conversational aspects or indicative of adaptive patterns of communication. Rather, these uses were generally associated with negative interactions with mothers and positively associated with adolescents' simultaneous speech acts. The question that remains is: Why do adolescents utilize these patterns if they appear to be maladaptive? Research has indicated that negative affect tends to increase and positive affect tends to decrease in parent-adolescent interactions as adolescents mature (Flannery et al., 2003) and anger increases across adolescence (Laursen & Collins, 2004). These lines of research may partially explain the affect behind adolescent use of negative valence and aversive interactions. However the overall patterns observed to accompany these uses were not limited to affect. Indeed, these patterns were also associated with high-involvement conversational speech acts. Tannen (1984) proposed that a 'clash' may occur when speakers use differing conversational styles, which may lead to negative feelings and/or misunderstandings. The findings here suggest that this incompatibility may be extended beyond conversational styles and speech acts to incorporate content and valence use. It may be that negative affect and interactions are a factor leading to conversational clashes. Alternately, conversational clashes may contribute to the use of negative affect and aversive

interactions. Together, these findings suggest that adolescents in the present study may simply have yet to develop the emotional and communicative skills necessary to de-escalate or avoid conflict in the way that mothers are able to. Thus, adolescents may rely on these conflict patterns as they learn to negotiate more adaptive patterns of communication in the context of family conflict.

Objective 2

Systematic Associations Between Psychophysiological Measures and Context-Specific Variables

Autonomic reactivity is the result of a complex of responses mediated by the ANS (El-Sheikh et al., 2009; Levenson, 1992) and multiple modes of physiological arousal are associated with conflict (Gottman, 1990). Thus, there are diverse and flexible ways in which individuals may respond to conflict. Indeed, a variety of associations were found between context-specific variables and measures of physiological arousal in both mothers and adolescents. Although the associations are reflective of group physiological change scores, they provide insight into state responding that may be invoked by different elements of conversation.

Psychophysiological research has produced an abundance of literature linking negative affective states to sympathetic responding (e.g., Beauchaine, 2001; Levenson, 1992) and positive affective states to parasympathetic responding (e.g., Levenson, 1992, 2003). In support of previous research, negative valence was found to be associated with measures of sympathetic responding and positive valence was found to be associated with measures of parasympathetic responding during conflict between mothers and adolescents in this sample. However, this study also found associations between sympathetic responding and negative content, intermediate aversive and high aversive interactions, and unsuccessful complete interruptions as well as associations between parasympathetic responding and positive and neutral content and positive and neutral interactions. These additional findings are important in that they provide some

evidence that emotion may not be the only factor behind physiological arousal that occurs during conflict. Content alone appears to independently affect physiological responding, as does the use of conversational speech acts. These findings indicate that physiological responding during conflict may not be merely associated with the emotion behind the words that were spoken, but with the content or wording of the conversation itself.

Interestingly, significant correlations were found between mother use of successful interruptions and adolescent PEP and between adolescent use of unsuccessful complete interruptions and mother HR. Both physiological measures were associated with parasympathetic reactivity. As was discussed previously, sympathetic reactivity was associated with mother use of unsuccessful complete interruptions. It may seem that interruptions, be they successful or not, are distressing or distracting and therefore arousing to the individual being interrupted. However, interruptions have been posited to serve a variety of functions in communication ranging from conversational engagement (Tannen, 1984) to confirmation or disconfirmation of what is being said (Beaumont & Cheyne, 1998). Given that the pattern observed in this study is of interrupting speakers affecting the physiological responding of speaking partners, it is posited here that speech acts used by parents and adolescents may regulate their partner's physiological arousal. Simultaneous speech acts such as interruptions may not merely serve to take the conversational floor or signal engagement. Rather, interruptions may be a way in which individuals calm their speaking partner or inhibit escalating content and/or affect.

ANS Response Profiles

Research has shown that autonomic response patterns are quite stable within individuals (Berntson et al., 1994; Salomon et al., 2000), and thus provide a glimpse at trait responding that associations between state responses and context-specific variables may not capture. In this study, mothers with reciprocal sympathetic response patterns were found to have significantly

higher rates of use of neutral content than mothers with coactivation patterns. Reciprocal sympathetic patterns are associated with an adaptive level of arousal to cope with environmental stressors (El-Sheikh et al., 2009), whereas coactivation is evoked in aversive stimuli and is linked to dysregulated responses to stress (Berntson et al., 1994). Findings from this study indicated that mothers, in general, used neutral aspects of conversation adaptively to maintain adolescent neutrality and avoid conflict escalation. Similarly, use of neutral content by mothers with reciprocal sympathetic response patterns may be indicative of a method mothers use to keep disagreements with adolescents from escalating that coactivators are not able to utilize effectively.

Processes of Parent-Adolescent Conflict

The research questions framed by the two objectives of this study served to explore the relationships among conversational speech acts, content and valence, and autonomic responding in the context of parent-adolescent conflict. These questions provided further insight into individual components of conflict. However, when these components are considered as a whole they revealed a larger pattern indicative of parent-adolescent conflict processes.

Moderate Conflict

Several researchers (e.g., Collins et al., 1997; Laursen & Collins, 2004) have contended that a moderate level of conflict is functional and even healthy in facilitating family relationships. However, research has yet to identify what constitutes moderate conflict or why moderate conflict may be adaptive. The findings from this study indicate that communication marked by low levels of aversion may represent moderate conflict. In this study, the low aversive interaction category was mainly comprised of negative content mixed with positive or neutral valences (i.e., negative interpersonal talk with positive affect). Arguably, even during a verbal exchange featuring low aversive interactions, some degree of amiability must exist between mothers and adolescents if there are positive components to the interaction. Use of low aversive

interactions was found to be accompanied by higher rates of listener responses for both mothers and adolescents. Mother use of low aversive interactions was also accompanied by a decrease in adolescent unsuccessful interruptions. Because no other associations between low aversive interactions and any of the context-specific variables were found, this indicates that for both mothers and adolescents in this study use of low levels of aversiveness served to increase listening behaviours, thus facilitating communication. These findings are consistent with Laursen and Collins (2004), in that verbal conflict appears to be functional when it is not extreme in nature and occurs in a relatively warm context.

Conversely, intermediate and high aversive interactions appear to represent levels at which parent-adolescent conflict ceases to be constructive and becomes maladaptive in terms of communication. Research has found that as adolescents mature both negative affect (Flannery et al, 1993) and affective intensity of conflict increase (Laursen & Collins, 1994; Laursen et al., 1998). In a similar vein, adolescents in the present study utilized intermediate and high aversive interactions, which are generally comprised of negative content mixed with neutral or negative valences (i.e., refuse with neutral affect, verbal attack with negative affect), significantly more often than mothers. Research has also shown that negative emotion can be particularly disruptive in dyadic interactions (Flannery et al., 1993) and is correlated with conflict intensity when expressed by both members of a dyad (Snyder et al., 1994). The negative valence components of intermediate and high aversive interactions in the present study are consistent with prior research. However, this study also found that intermediate and high aversive interactions were less likely to be associated with positive or neutral content and valence, were more likely to be associated with negative conversational components and simultaneous speech acts from partners, and were related to partner physiological arousal. Whether an individual's responses are evoked by or in response to the speaking partner remains to be investigated. However, it appears that a

process of escalation may occur at these levels of aversion. This supports Gottman's (1991) hypothesis that escalation of aversive or negative behaviour produces an 'emotional flooding' that reduces the cognitive skills needed to produce constructive conflict resolution strategies. These negative emotional states may then reduce the range of behavioural and cognitive responses an individual has available to cope with environmental demands, such as problem solving or compromise during conflict.

Limitations

Although these findings have possible implications for future research, they are provisional in nature and were derived from a thesis study with several limitations. First, there were limitations stemming from the sample size. Investigating a relatively small number of dyads was planned at the conceptual stages of this thesis because of the complexity of incorporating two behavioural coding systems. However, the loss of physiological data that was mainly due to hardware failure during data collection was not anticipated. This led to a decreased number of participants with viable data and uneven groupings of adolescents and mothers for analysis of autonomic reactivity. In turn, this limited power in statistical analyses of both contextual and physiological variables.

Additionally, these data were analyzed using correlations, which limit the interpretation of associations between context-specific variables. In essence, the data from this study indicate how individual ratios for a given aspect of communication were related, but they cannot determine or reflect the sequence in which the aspects of communication occurred. Therefore, future research is needed to examine these data using longitudinal analyses such as sequential analysis or state-space analysis within a dynamic systems perspective (e.g., Granic et al., 2003).

Further limits were imposed by difficulties encountered with the measurement of contextual and affective features of the parent-adolescent discussions using the FPPC. First, the

FPPC was not optimally sensitive to capturing adolescent verbal and non-verbal behaviours. The FPPC was developed from observational data on a variety of age groups ranging from preschoolers to adolescents. However, many of the coding examples and decision rules in the FPPC coding manual appeared to be more typical of younger children. For example, the verbal content code of 'advise' was broadly defined as a comment aimed to teach a specific behavior or skill and one example of this code described a parent teaching a child the difference between the number 8 and the number 3. Thus, in some cases, coders needed to upwardly extend some of the decision rules based on parent-preschooler interactions to being applicable to parent-adolescent interactions. Coders were reliable with one another in making these age-appropriate adaptations to the coding decision rules; however it should still be noted that adaptations were required due to the FPPC's tendency to describe behaviours of younger children rather than adolescents.

Second, the FPPC is an amalgamation of three coding systems developed by researchers at the Oregon Social Learning Center that was intended to be more amenable to laboratory settings, rather than in-home observations as had been the focus of the previous systems. However, it was found that this system had elements that were that were not ideal for a laboratory discussion task. The verbal content codes of 'command' and 'coerce' were operationally defined as directives for behavior change that were potentially observable during the task. Given that the parent-adolescent discussions were about areas of disagreement that occur in the context of the family environment rather than the lab environment, some statements that otherwise would have been deemed commanding or coercive (negative content codes) were coded as 'talk' (a neutral content code) simply because the directive was not observable.

Third, few physical content codes were assigned. Mothers and adolescents were asked to remain in their seated positions throughout their discussion and to avoid excessive movements due to the physiology equipment. Although these constraints are needed to preserve the integrity

of the physiological equipment and data, it may be that participants suppressed some of their natural physical behaviors over the course of their conversations due to the movement restrictions. It may also be that adolescents simply do not use physically aversive behaviors at the same rate as young children. Alternately, a combination of both may account for the low number of physical behaviours observed.

Implications and Future Directions

These findings, though exploratory, highlight the multi-faceted nature of parent-adolescent conflict and begin to address some of the many gaps in literature related to the topic. Most importantly, this study adds to the current literature in three major ways. First, this study examined the processes of conflict rather than the outcomes. Second, this study examined normative or moderate levels of conflict that are typical of most parent-adolescent relationships. These first two points are important because a majority of extant literature focuses on chronic, intense conflict and maladaptive outcomes, which are atypical of most families. Third, this study directly investigated physiological patterns of arousal between parents and adolescents in the context of family conflict. Few studies have done so, and no known studies have examined parent-adolescent dyads during verbal conflict.

The results from this explorative study pave the way for future research in three ways. First, although this study collapsed content into positive, neutral, and negative categories, content was shown to be associated with both context-specific and physiological variables. Moreover, some of these relationships appeared to be independent of affect or emotion. Given that the content of parent-adolescent conflict has largely been unexplored, future research should examine specific content such as advisory statements and self-disclosures to further identify how content plays a role in the conflict process.

Second, research should aim to identify what comprises moderate or healthy conflict. As has been stated previously, relatively little is known about what defines moderate conflict or

what makes a moderate amount of conflict healthy and functional in the family context. Identifying moderate conflict is not only of interest to empirical research, it may have practical implications for working directly with families. This study found that low levels of aversiveness may represent a moderate level of conflict. However, this conclusion is based upon complex relationships found between content, valence, conversational speech acts, and physiological responding. Future work should therefore continue to explore the nature of moderate conflict by utilizing multiple methods.

And third, the information gleaned from this project may be used to extend the focus on psychophysiological responding past romantic dyads to parent-adolescent dyads, thus providing further information on how parents and adolescents regulate their own arousal and influence the arousal of their partner during conflict. Such future exploratory work can undoubtedly provide a foundation on which to build our knowledge of parent-adolescent conflict.

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Appendices

Appendix A

UBC Behavioural Ethics Committee Certificate of Approval

The University of British Columbia
Office of Research Services
Behavioural Research Ethics Board
Suite 102, 6190 Agronomy Road, Vancouver, B.C. V6T 1Z3

CERTIFICATE OF APPROVAL - FULL BOARD

PRINCIPAL INVESTIGATOR:	**INSTITUTION / DEPARTMENT:**	**UBC BREB NUMBER:**
Sheila Marshall	UBC/Arts/Social Work	H07-01717

INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT:

Institution	Site
UBC	Vancouver (excludes UBC Hospital)

Other locations where the research will be conducted:
N/A

CO-INVESTIGATOR(S):
N/A

SPONSORING AGENCIES:
N/A

PROJECT TITLE:
Parent-adolescent conversations and psychophysiological responses

REB MEETING DATE:	**CERTIFICATE EXPIRY DATE:**
April 24, 2008	**April 24, 2009**

DOCUMENTS INCLUDED IN THIS APPROVAL: **DATE APPROVED: May 23, 2008**

Document Name	Version	Date

The application for ethical review and the document(s) listed above have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.

Approval is issued on behalf of the Behavioural Research Ethics Board and signed electronically by one of the following:

Dr. M. Judith Lynam, Chair
Dr. Ken Craig, Chair
Dr. Jim Rupert, Associate Chair
Dr. Laurie Ford, Associate Chair
Dr. Daniel Salhani, Associate Chair
Dr. Anita Ho, Associate Chair

Appendix B

ANOVA Results for Adolescent Context-Specific and Autonomic Variables by Diagnostic Group

Adolescent Variables	Control		Conduct Disorder		Comorbid		Depressed			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	F^a	*p*
Conversational Style										
N	68.35	(25.67)	63.99	(26.39)	81.27	(30.03)	77.55	(39.27)	0.69	.565
LR	2.32	(2.61)	2.41	(3.24)	4.62	(8.73)	5.12	(7.59)	0.58	.632
O	3.30	(1.97)	3.22	(2.78)	1.93	(2.33)	4.12	(2.30)	1.42	.253
SI	7.35	(6.13)	14.53	(15.34)	5.50	(3.05)	5.93	(3.15)	2.38	.086
UIC	2.73	(5.48)	2.40	(2.32)	3.04	(3.43)	2.52	(2.73)	0.05	.983
UII	1.55	(1.95)	3.88	(5.18)	1.48	(1.97)	1.22	(1.39)	1.66	.193
Content and Valence										
Positive Content	16.04	(16.89)	10.06	(9.27)	7.75	(7.03)	9.59	(7.28)	1.10	.362
Neutral Content	37.93	(33.65)	24.86	(23.82)	33.98	(22.37)	29.92	(22.42)	0.47	.706
Negative Content	20.91	(10.98)	25.32	(17.07)	19.39	(13.33)	25.57	(20.96)	0.39	.764
Positive Valence	32.41	(23.66)	27.81	(31.77)	26.62	(20.24)	27.52	(16.52)	0.13	.944
Neutral Valence	85.55	(31.92)	56.07	(30.29)	77.61	(30.17)	77.51	(36.30)	1.59	.209
Negative Valence	31.04	(27.58)	65.12	(48.33)	44.77	(30.00)	43.97	(45.92)	1.38	.264
Positive Interaction	31.98	(21.81)	27.33	(30.50)	27.11	(17.35)	26.77	(15.77)	0.13	.942
Neutral Interaction	70.31	(27.63)	48.14	(28.32)	60.01	(23.16)	55.10	(27.25)	1.28	.296
Low Aversive Interaction	8.09	(5.09)	5.63	(4.38)	11.64	(12.23)	13.78	(16.05)	1.19	.326
Intermediate Aversive Interaction	36.73	(22.22)	64.23	(43.20)	47.25	(23.70)	51.92	(41.48)	1.20	.322
High Aversive Interaction	1.90	(2.17)	3.68	(4.30)	2.99	(5.40)	1.44	(4.32)	0.58	.631
Physiological Measures										
RSA Mean Change Score	-0.30	(0.74)	0.34	(0.64)	-0.11	(0.50)	-0.31	(0.77)	1.98	.137
PEP Mean Change Score	-1.70	(4.75)	-0.54	(4.70)	0.81	(3.83)	0.34	(2.18)	0.71	.552
HR Mean Change Score	3.90	(5.05)	1.21	(3.56)	3.59	(3.45)	4.70	(4.44)	1.23	.315
SCR Mean Change Score	1.31	(1.69)	1.25	(1.73)	0.19	(2.78)	2.61	(2.89)	1.68	.189

Note. N = No turn-taking violation, LR = listener response, O = overlap, SI = successful interruption, UIC = unsuccessful interruption (complete), UII = unsuccessful interruption (incomplete), RSA = respiratory sinus arrhythmia (log[beats/min^2/Hz]), PEP = pre-ejection period (ms), HR = heart rate (beats/min), SCR = skin conductance response (nonspecific fluctuations).

[a] Degrees of freedom were 3,39

Appendix C

ANOVA Results for Mother Context-Specific and Autonomic Variables by Diagnostic Group

	Control		Conduct Disorder		Comorbid		Depressed			
Mother Variables	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	F^a	*p*
Conversational Style										
N	42.45	(18.51)	31.95	(18.83)	53.90	(25.89)	42.45	(15.72)	1.98	.134
LR	3.92	(5.22)	0.39	(0.52)	0.54	(0.94)	2.49	(4.67)	2.34	.089
O	1.88	(1.55)	0.98	(1.26)	0.97	(0.80)	1.69	(2.37)	0.93	.435
SI	2.22	(1.90)	1.73	(2.71)	2.41	(1.93)	2.23	(2.03)	0.18	.906
UIC	0.90	(1.11)	0.96	(1.38)	0.27	(0.65)	0.11	(0.32)	1.95	.138
UII	0.55	(0.80)	1.52	(1.96)	0.36	(0.76)	0.80	(1.13)	1.67	.190
Content and Valence										
Positive Content	30.49[b]	(11.86)	45.72	(13.32)	24.81[c]	(15.35)	28.67[b]	(13.22)	4.63	.008
Neutral Content	100.52[c]	(19.03)	79.66	(7.50)	103.96[c]	(18.58)	106.55[c]	(14.02)	6.05	.002
Negative Content	17.99	(13.58)	23.63	(10.72)	20.22	(13.39)	13.77	(11.47)	1.05	.381
Positive Valence	45.55	(16.04)	33.28	(19.56)	28.58	(16.80)	33.96	(16.73)	1.85	.156
Neutral Valence	92.21	(15.25)	88.49	(30.40)	90.80	(25.14)	104.12	(18.85)	0.85	.476
Negative Valence	11.24	(13.98)	27.23	(25.32)	29.62	(35.42)	10.92	(15.18)	1.74	.175
Positive Interaction	43.41	(16.96)	33.18	(16.38)	28.74	(16.11)	33.87	(17.67)	1.44	.247
Neutral Interaction	75.40	(15.72)	74.03	(26.32)	76.55	(20.64)	87.33	(14.27)	0.88	.462
Low Aversive Interaction	10.31	(7.06)	4.38	(4.20)	5.75	(6.83)	9.96	(10.56)	1.64	.198
Intermediate Aversive Interaction	19.76	(17.95)	36.18	(22.56)	36.07	(30.98)	17.84	(17.66)	1.89	.148
High Aversive Interaction	0.11	(0.37)	1.23	(2.78)	1.89	(4.23)	0.00	(0.00)	1.28	.297
Physiological Measures										
RSA Mean Change Score	-0.04	(0.99)	0.25	(0.50)	0.00	(0.41)	-0.51	(0.39)	1.65	.203
PEP Mean Change Score	0.92	(2.70)	-1.21	(3.01)	0.65	(3.55)	-0.13	(4.47)	0.58	.633
HR Mean Change Score	2.86	(3.23)	3.05	(3.65)	2.85	(5.55)	3.72	(3.88)	0.06	.979
SCR Mean Change Score	0.31	(1.69)	1.14	(1.22)	0.76	(0.85)	1.19	(0.91)	1.07	.374

Note. N = No turn-taking violation, LR = listener response, O = overlap, SI = successful interruption, UIC = unsuccessful interruption (complete), UII = unsuccessful interruption (incomplete), RSA = respiratory sinus arrhythmia (log[beats/min^2/Hz]), PEP = pre-ejection period (ms), HR = heart rate (beats/min), SCR = skin conductance response (nonspecific fluctuations).

[a] Degrees of freedom were 3,39

[b] Differs significantly from conduct disorder group at $p < .05$.

[c] Differs significantly from conduct disorder group at $p < .01$.