

The Dyadic Trait Fit between Adolescent Aggression and Parent Alienation in a Process  
Involving Family Interactions, Adoption Status, and Adolescent Externalizing Behavior

A DISSERTATION  
SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL  
OF THE UNIVERSITY OF MINNESOTA  
BY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF  
DOCTOR OF PHILOSOPHY

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May 2012

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## **Acknowledgements**

This dissertation would not have been possible without several people who, individually and collectively, have supported me in my pursuit of a Ph.D. First, I would like to acknowledge and extend my sincerest gratitude to my dissertation committee: Drs. Martha A. Rueter, Hal Grotevant, Jodi Dworkin, and Ascan Koerner. Each member uniquely contributed to my academic and professional learning and growth, and always remained positive and hopeful. I especially want to thank my advisor, Dr. Martha Rueter, for her steady and consistent mentoring, unwavering support, patience, and guidance in quantitative methods, empirical journal writing, grant writing, and teaching. Dr. Rueter has taught me so much about the technical aspects of research (e.g. statistics, writing), working collaboratively, and about striving to be “humble yet confident.” I would like to thank Hal Grotevant for his initial inspiration and introduction to adoption research, and to the Department of Family Social Science. Dr. Grotevant has mentored me in every aspect of academia; he continues to be an inspiration and mentor. I would like to thank Dr. Dworkin for expert advising during my first year. She has always challenged me to make pithy statements and to be succinct in my writing. Lastly, I would like to thank Dr. Koerner for mentoring me in theory and critical thinking.

Next, I would like to acknowledge the families who participated in the Sibling Behavior and Interaction Study (SIBS) for allowing me to enter their lives and to learn so much about them. I would also like to thank the SIBS Principal Investigators, Drs. Bill Iacono and Matt McGue, for allowing me to work with their data.

I would like to thank the Department of Family Social Science community: administrative staff, faculty, and fellow students. I hope to continue with the consultations, collaborations, and friendships in the coming years.

I would also like to thank family and friends who have sustained and nourished me – a special thank you to my sister, Sheila, Yasmine, and Sally.

Finally, my biggest and most heartfelt acknowledgement and gratitude is to Lee and Kai Miok. They have been endlessly supportive and have sacrificed so much to allow me to pursue this Ph.D. I cannot thank them enough for being there for me every step of the way, and for always keeping their hearts so open and full of love. I am eternally grateful to them both.

This dissertation research was supported by a Department of Family Social Science Waller fellowship and M. Janice Hogan fellowship. The Sibling Behavior and Interaction Study (SIBS) was supported by a grant from the National Institution on Alcohol Abuse (AA11886).

## **Dedication**

To Lee and Kai Miok

## Abstract

To better understand the small but noteworthy risk for externalizing behaviors for adopted youth, the present study tested a complex family process involving personality and family interactions as an explanation of adopted adolescent adjustment. Goodness of fit theory, person-environment transactional theory, and Family Communication Patterns Theory (FCPT) informed the study. Data from 615 families from the Sibling Interaction and Behavior Study (SIBS; McGue et al., 2007) were used to test study hypotheses using the actor-partner interdependence model (APIM). Personality was assessed using the Multidimensional Personality Questionnaire (MPQ). Observational data were used to measure family members' individual communicative behavior, operationalized as *Conformity*- and *Conversation*-orientations, and adolescent conflict. Overall, findings supported the personality-initiated family process and the study's central hypothesis. Indeed, the dyadic trait fit (DTF) between adolescent aggression and parent alienation had an affect on a family interactive process that explained substantial variance in adolescent externalizing behavior. The direct associations among study constructs explained the most variance (and accounted for the largest increases in variance) in adolescent *Conversation*, parent *Conversation*, adolescent conflict, and adolescent externalizing behavior. Moreover, direct associations between adoption status and (a) conflict and (b) externalizing appear to be far more complex than previous research has suggested.

*Keywords:* personality, dyadic trait fit, family interactions, child adjustment, adoption status

## Table of Contents

Acknowledgements	i
Dedication	iii
Abstract	iv
Table of Contents	v
List of Tables	viii
List of Figures	x
Introduction	
A Brief Note about Terminology	4
Theoretical Framework	4
Goodness of Fit and Dyadic Trait Fit (DTF)	5
Person-Environment Transactional Theory	6
Family Communication Patterns Theory (FCPT)	8
Actor-Partner Interdependence Model (APIM)	11
Personality	11
Family Interactions	13
Adoption Status	14
The Present Study	15
Method	
Participants	16
Procedures	17

Measures	17
Analysis Plan	21
Missing Value Analysis	25
Results	
Preliminary Analyses	26
Hypothesis Testing	26
Research Question 1 Findings	27
Research Question 2 Findings	27
Research Question 3 Findings	28
Research Question 4 Findings	28
Research Question 5 Findings	29
Discussion	
The Conceptual Process	30
Utility of the Theoretical Framework	32
Personality	35
Adoption Status	36
Weaknesses	39
Strengths	40
Limitations to Generalizability	41
Concluding Remarks	42
References	44
Tables	63



Figures	83
Appendix A: Dissertation Proposal	87
Appendix B: Addendum to Dissertation Proposal	117

## List of Tables

Table 1. Intercorrelations, Means, and Standard Deviations for all Study Variables	63
Table 2. Summary of Model Fit Statistics for all Mother (Father)-Adolescent Models	67
Table 3. Summary of Explained Variance ( $R^2$ ) for all Mother (Father)-Adolescent Models	69
Table 4. RQ1 Standardized Coefficients ( $\beta$ ) for all Mother (Father)-Adolescent Conceptual Process Models	71
Table 5. RQ2 Standardized Coefficients ( $\beta$ ) for all Mother (Father)-Adolescent Base (or Control) Models	72
Table 6. RQ3 Standardized Coefficients ( $\beta$ ) for all Mother (Father)-Adolescent Actor (or Main) Effect Models	73
Table 7. RQ4 Standardized Coefficients ( $\beta$ ) for all Mother (Father)-Adolescent Partner Effect Models	74
Table 8. Summary of Indirect Effects for all Mother (Father)-Adolescent Models	75
Table 9. RQ5 Standardized Coefficients ( $\beta$ ) for all Mother (Father)-Adolescent Dyadic Trait Fit (DTF) Interaction Models	76
Table 10. RQ5 Standardized Coefficients ( $\beta$ ) for all Mother (Father)-Adolescent Adoption Status (Main Effect) Models	78
Table 11. RQ5 Standardized Coefficients ( $\beta$ ) for all Mother (Father)-Adolescent Adoption Status (Interaction Effect) Models	79

Table 12. Summary of Factor Loadings ( $\lambda$ ) for all Mother (Father)-  
Adolescent Models

81

## List of Figures

Figure 1. Conceptual Model	83
Figure 2. Family Process Model	84
Figure 3. Dyadic Trait Fit (DTF) Interaction Model 1 (Mother- Adolescent)	85
Figure 4. Adoption Status Interaction Model 1 for Parent-Adolescent Dyads	86

## The Dyadic Trait Fit between Adolescent Aggression and Parent Alienation in a Process Involving Family Interactions, Adoption Status, and Adolescent Externalizing Behavior

In the general population, behavior disorders are the second most prevalent (19.1%) presenting issue among youth ages 13 to 18 years; nearly 10% report severe behavior disorders (Merikangas et al., 2010). According to the National Institute of Mental Health, more than 40% of detained youth have a disruptive behavior or conduct disorder (National Institute of Mental Health, 2002). Externalizing problems (defined as antisocial or delinquent behaviors) are clearly a significant health issue in the general population.

Nearly two decades of research have focused on describing a direct association between adoption status (adopted versus non-adopted) and child adjustment. From this we can conclude that although most adoptees are well adjusted, there is a “consistent, low magnitude difference” (Grotevant, Rueter, von Korff, & Gonzales, 2011) for externalizing behaviors between adopted and non-adopted youth (c.f. Bimmel, Juffer, van IJzendoorn, & Bakermans-Kranenburg, 2003; Feigelman, 2002; Haugaard, 1999; Juffer & van IJzendoorn, 2005; Keyes, Sharma, Elkins, Iacono, & McGue, 2008; Wierzbicki, 1993). Per this small but noteworthy difference, adopted adolescents are at an increased risk for externalizing behaviors and are more likely (than non-adoptees) to have contact with a mental health professional (Brand & Brinich, 1999; Keyes et al., 2008). Although some variation in externalizing behavior may be due to prenatal or preplacement factors (Grotevant et al., 2006) or to a small number of cases (Brand & Brinich, 1999), we know

relatively little about what accounts for this notable difference. Given that one and a half million (approximately 2%) United States children under the age of 18 are adopted, a better understanding of their adjustment is needed.

Leading adoption researchers have suggested that to move beyond merely describing the direct association between adoption status and externalizing behaviors, attention should be paid to explanatory family processes that help explain variance in child adjustment (Palacios, 2009; Palacios & Brodzinsky, 2010). In response, a previous study by Koh and Rueter (2011) was the first to reveal a more complex association between adoption status and externalizing behaviors (e.g., Juffer & van IJzendoorn, 2005; Keyes et al., 2008). Specifically, the study found that the previously revealed direct association was at least partially explained by a more complex, personality-initiated and conflict-mediated process. This finding lends credence to the earlier call (Palacios, 2009; Palacios & Brodzinsky, 2010) for a focus on explanatory processes and lays the foundation for testing a more complex family process. The present study proposes and tests such a process.

This study's central hypothesis, informed by previous empirical research, is that personality contributes to a process involving family interactions and adolescent externalizing behavior that differs in adoptive and non-adoptive families (see Figure 1). Specifically, empirical evidence suggests that personality, family interactions, and adolescent externalizing behaviors have varying degrees of associations in both general and adoptive populations. Child personality (general: Eisenberg et al., 2000, 2009; adoptive: Koh & Rueter, 2011), family communication (general: Steinberg, 2001;

adoptive: Rueter & Koerner, 2008), and conflict (general: Eisenberg et al., 2008; Laursen & Hafen, 2010; adoptive: Koh & Rueter, 2011) are each associated with child adjustment. Together, these associations support testing how these constructs work together in a personality-initiated family process model (see Figure 2).

Testing the study's central hypothesis is an important step toward understanding the small but noteworthy difference in and risk for externalizing behaviors for adopted adolescents. The central hypothesis is informed by a theoretical framework and is depicted in two ways: broadly (see Figure 1, conceptual model) and specifically (see Figure 2, family process model). As shown in Figure 1, personality, family communication, and adolescent conflict, all contribute to externalizing outcomes in a complex process that likely differs in adoptive and non-adoptive families. Figure 2 expands on this conceptual process by suggesting that there are two personality-initiated (one by adolescent aggression, the other by parent alienation) interdependent communicative processes that contribute to a family process that explains variance in adolescent externalizing behavior. To test the central hypothesis, five research questions (RQ) are posed. With the exception of the first question, which refers to Figure 1, all subsequent questions refer to Figure 2:

RQ1: Is there support for the overall conceptual process?

RQ2: Is a theorized process involving adolescent aggression, parent alienation, adolescent and parent communication, and adolescent conflict associated with adolescent externalizing behavior as actor (or main) effects?

RQ3: Will parent alienation and adolescent aggression independently elicit a response in the other's communicative behavior as a partner effect?

RQ4: What is the effect of dyadic trait fit on the overall family process?

RQ5: What is the role of adoption status in the overall family process?

A recent study shows that externalizing behaviors for adoptees have moderate stability from childhood to emerging adulthood (Grotevant, Rueter, von Korff, & Gonzales, 2011). With a better understanding of what may account for the small but noteworthy difference in externalizing behaviors for adopted adolescents, clinical interventions can be aimed at reducing them.

### **A Brief Note about Terminology**

In the present study, terminology regarding personality and adoption status should be clarified. First, personality is conceptualized as a two-level concept comprised of dispositional traits and characteristic adaptations. Dispositional traits, which are the stable attributes of a person, are expressed as characteristic adaptations in dyadic interactions occurring in a given time, context, and/or social role (McAdams & Pals, 2006). Consistent with this conceptualization, it is reasonable to expect individual (or dispositional) traits to manifest themselves as characteristic adaptations in a family communicative environment. This study uses the term personality in reference to children and adults. Second, adoption status refers to those who are either adopted or not adopted.

### **Theoretical Framework**

In this study, goodness of fit theory (Lerner, 1993; Thomas & Chess, 1977), person-environment transactional theory (Caspi et al., 1987, 1988; Scarr & McCartney,



1983), and Family Communications Patterns Theory (FCPT; Koerner & Fitzpatrick, 2002a, 2000b, 2004, 2006) provide important theoretical grounding for both a broad conceptual process (Figure 1) and a specific aggression- and alienation-initiated one (Figure 2). Together, these theories help explain how individual personality traits and family interactions (i.e., communication) contribute to a process through which children shape their own behavioral outcomes (Bell, 1968; Lewis, 1981). Additionally, the actor-partner interdependence model (APIM; Kenny, Kashy, & Cook, 2006) is an important methodological framework for testing the personality-initiated individual and interdependent communicative associations (see Figure 2).

***Goodness of Fit Theory.*** Application of this theory to the study's central hypothesis provides an important framework for understanding how personality contributes to a broad conceptual process (see Figure 1), and a specific one (see Figure 2). Goodness of fit theory states that the fit between child characteristics and parental demands contributes to child functioning (Lerner, 1993; Thomas & Chess, 1977).

Yet goodness of fit theory does not account for both child and parent characteristics. In response, Koh, Davis, Walker-Spaan, and Rueter (2012) extended the theory to account for how *both* child and parent characteristics (i.e., individual personality traits) influence individual functioning in a concept they call dyadic trait fit (DTF). DTF is a process whereby individual personality traits work together to influence individual functioning. Based on their definition, it makes theoretical and logical sense to expect that, to the extent that different combinations of child and parent personality traits

fit (or do not), they will promote (or hinder) individual functioning in an adaptive (or maladaptive) pattern.

In the present study, the DTF between adolescent aggression and parent alienation is expected to affect the overall family process that contributes to adolescent functioning (see Figure 2). Moreover, it is logical to expect that negative traits beget negative outcomes (e.g., conflict, externalizing behaviors). Per DTF, a combination of negative traits (i.e., aggression and alienation) likely results in a maladaptive individual functioning pattern. Empirical studies support this reasoning. For instance, Kim, Conger, Lorenz, & Elder (2001) found evidence that maladaptive negative emotions reciprocally influenced parent-child interactions.

What is unknown is whether positive parent-adolescent interactions (i.e., warm, responsive, open communication) mediate, or buffer, a maladaptive DTF pattern. Reason dictates that negative traits would be negatively associated with positive parent-child interactions. Logic also suggests that positive parent-adolescent interactions would be negatively associated with adolescent conflict. Taken together, these two negative association patterns suggest that positive interactions might offset the negative effects of both negative personality traits and conflict. The present study seeks to test this notion: that positive family communication mediates, or potentially offsets, a negative DTF effect on adolescent functioning (see Figure 2). The next theory discussed will help further illuminate both DTF, and DTF's effect on the proposed Figure 2 process.

***Person-Environment Transactional Theory.*** Integration of transactional theory into this study's theoretical framework explicates the proposed family process in two

important ways. First, per transactional theory (Caspi et al., 1987, 1988; Sameroff, 1975; Scarr & McCartney, 1983), continuity and change vis-à-vis family interactions are understood within the context of evocative, active, or passive gene-environment correlations (Moffitt, Caspi, & Rutter, 2005; Scarr & McCartney, 1983). For example, an evocative gene-environment correlation suggests that parents respond differently to their children based on their personality traits (and vice versa). Hence, heritable traits are correlated with an outcome or behavior in the environment. In adoptive families, parents and children do not share genetic relations and are less likely to share heritable traits. Individual personality traits such as aggression are heritable (DiLalla, 2002; Miles & Carey, 1997). Consequently, in the context of evocative gene-environment correlations in adoptive families where adoptive parent and children are less likely to have similar personalities, how genes and the environment correlate may be more unknown.

Second, transactional theory, which suggests that family interactions contribute to the process of shaping individual outcomes (Bell, 1968; Lewis, 1981), helps further explain DTF's effect on the overall process. As shown in Figure 2, DTF's effect on adolescent functioning is proposed to occur within the context of parent-adolescent communicative interactions; a process that further contributes to adolescent conflict and adolescent externalizing behavior. As previously mentioned, positive family interactions are expected to mediate the negative effects of DTF on individual functioning conceptualized in a reciprocal, transactional framework.

Empirical family transactional (Patterson, 1982) and parent-adolescent reciprocal effects research (Rueter & Conger, 1998) supports a person-environment transactional

framework. Mounting evidence suggests that reciprocal parent-child interactions influence behavior over time (Conger & Ge, 1999; Kim, Conger, Lorenz, & Elder, 2001; Larsson, Viding, Rijdsdijk, & Plomin, 2008; Rueter & Conger, 1998). For instance, Rueter and Conger (1998) found evidence of maladaptive reciprocal effects where negative behaviors prevailed. Specifically, negative, inconsistent parenting led to a decrease in positive adolescent behavior, and positive, nurturant parenting also decreased in the context of negative adolescent behavior. Adding to our theoretical framework, the next theory expounds on how communication may contribute to the proposed process (see Figure 2).

***Family Communication Patterns Theory (FCPT)***. FCPT (Koerner & Fitzpatrick, 2002a, 2002b, 2004, 2006) informs the personality-communication interdependent processes (see Figure 2). Building on existing theories (e.g., Baumrind, 1971; Burleson, Delia, & Applegate, 1995; McLeod & Chaffee, 1972, 1973; Reiss, 1981), FCPT posits that creating a family shared social reality (FSSR) – defined as family members’ shared perceptions, cognitions, and evaluations of their social world – is central to healthy family functioning and child well-being. Sharing a social reality increases the likelihood of greater mutual understanding, fewer conflicts and externalizing behaviors, and better overall child and family adjustment.

Per FCPT, the impetus for communication is for families to create a family social shared reality (FSSR; Koerner, 2007). Creation of a FSSR in adoptive families may rely more heavily on family communication because cognitive processes (e.g. values, beliefs, and attitudes) involved in perceiving the social world are at least partially genetically

derived (Alford, Funk, & Hibbing, 2005; Olson, Vernon, Harris, & Jang, 2001; Tesser, 1993). Genetically related family members can rely on similar cognitive processes to achieve a shared reality, but genetically unrelated family members must rely more heavily on communication. Because FCPT assumes that all family members participate in creating a shared reality, adoption status should be considered as a factor that influences family communication.

FCPT further proposes that communication occurs along two dimensions: *Conversation* and *Conformity*. The *Conversation* orientation is characterized by frequent, spontaneous, and open interactions among family members; this orientation encourages all family members to participate in the creation of a FSSR. The *Conformity* orientation is characterized by uniform attitudes, beliefs and values. Family members in authority roles (e.g., parents) often define the FSSR. This orientation is more susceptible to developmental considerations, as it is unlikely for younger children to define the FSSR.

In an incremental approach to testing all aspects of the conceptual model involving personality, family interactions, adoption status, and child adjustment (see Figure 1), the present study focused solely on the *Conversation* dimension for two reasons. First, doing so helped to keep an already complex model (see Figure 2) manageable and parsimonious. Second, the positive association between the quality of family communication (in particular, warm and open communication) and child adjustment (Barnes & Olson, 1985; Brage & Meredith, 1994; Masselam, Marcus, & Stunkard, 1990; Steinberg, 2001) supports inclusion of the *Conversation* dimension in the present study as one step in an incremental approach. Also, research supporting the

association between communication and adjustment is not limited to general population studies. For instance, a study by Rueter & Koerner (2008), which used FCPT as its theoretical framework, found that adolescents in adoptive families that deemphasized openness were at a significantly greater risk for externalizing problems than adolescents in adoptive families that emphasized open communication.

This study also seeks to build on and strengthen FCPT; the theory does not explain why family members communicate the way they do. As depicted in Figures 1 and 2, this study suggests that personality, or specific dispositional traits, may help explain each family members' communicative behavior (e.g., *Conversation*). For instance, individual traits (i.e., adolescent aggression and parent alienation) are likely to be associated with one's own individual behavior (an actor effect).

Per evocative gene-environment correlations, different individual traits are likely to evoke varied family member responses. Recall that *Conversation* behavior is defined as frequent, spontaneous, and open interactions. Thus, it is reasonable to surmise that an adolescent exhibiting high aggression would evoke a negative parent response – specifically, less frequent, less warm, and less open (more defensive) parent *Conversation* behavior (a partner effect). A similar partner effect might be expected in the relationship between parent alienation and adolescent *Conversation*: higher levels of parent alienation would be associated with lower levels of adolescent *Conversation*. A model that simultaneously tests actor (or main, individual) and partner (or interdependent) effects is needed to test these theorized associations.

*Actor-Partner Interdependence Model (APIM)*. The APIM (Kenny et al., 2006) is an appropriate methodological framework for testing how adolescent aggression and parent alienation are each directly associated with (a) his/her own communicative behavior (i.e., have an actor effect), and (b) another family member's communicative behavior (i.e., have a partner effect). Based on whether actor and partner effects co-exist, and if they are in the same or opposite direction, different parent-child relationship patterns emerge (Kenny & Cook, 1999; Kenny & Ledermann, 2010).

Together, goodness of fit theory, transactional theory, FCPT, and the APIM provide an important context for conceptualizing and testing associations among personality, family interactions, and adolescent externalizing – broadly (see Figure 1), and specifically (see Figure 2). Each theory highlights the role of heritability in the theorized process; thus, inclusion of adoption status in the overall process will help discern nuances and differences in adoptive and non-adoptive families. Next, building on this theoretical framework, attention is paid to relevant empirical research on personality, family interactions, and adoption status that supports both the broad (Figure 1) and specific (Figure 2) family processes proposed in this study.

### **Personality**

Through decades of descriptive research, personality researchers have converged on a basic adult personality structure: the Five-Factor model (FFM) or Big Five trait taxonomy (John, Naumann, & Soto, 2008). The FFM is most easily remembered by the mnemonic, OCEAN: Openness/Intellect, Conscientiousness, Extraversion,

Agreeableness, and Neuroticism. Alternate two-, three-, and four- factor personality models are structurally related to the FFM (Markon, 2009).

Child personality traits later develop into adult personality and, therefore, are structurally related to the FFM (Rothbart, Ahadi, & Evans, 2000; Shiner & DeYoung, in press). Unlike adult personality researchers, child personality (commonly referred to as temperament) researchers have not yet identified a common structure. There are five primary competing child personality models in existence: (1) Thomas & Chess, (2) Buss & Plomin's *EASI* model, (3) Rothbart, (4) Kagan's inhibition model and, (5) Cloninger's 7-factor. Of the five, Rothbart's research has been most successful in demonstrating conceptual links between childhood and adult personality (Shiner & DeYoung, in press). For example, negative emotionality (part of a 3-factor personality structure, and comprised of three lower order facets: aggression, alienation, and stress reactivity; Tellegen & Waller, 2008) broadens into adult Neuroticism (Shiner & DeYoung, in press).

General population research supports an association between child personality and negative behavioral child outcomes. For example, Barber (1994) found that adolescents with a difficult (compared with easier) personality were more likely to engage in conflict. Similarly, higher child negative emotionality (comprised of aggression, alienation, and stress reactivity) has been associated with more externalizing behaviors (Eisenberg et al., 2000, 2009; Rhee, Cosgrove, Schmitz, Haberstick, Corley, & Hewitt, 2007).

Recent research using an adoptive and non-adoptive family sample has identified salient negative emotionality factors. Of the three lower order negative emotionality



factors, only aggression and alienation play a role in associations among family communication, conflict, and externalizing behaviors (Koh, Koerner, Davis, & Rueter, 2012; Koh & Rueter, 2011). For instance, Koh & Rueter (2011) found that only adolescent aggression contributed to both conflict and externalizing outcomes. Another study by Koh et al. (2012) identified adolescent aggression and parent alienation in associations with family communication. Together, these studies provide justification for focusing on the role of adolescent aggression and parent alienation in their associations with family communication, conflict, and externalizing behaviors (see Figure 2). Because personality is largely heritable (estimates range from 40-80%; Krueger, South, Johnson, & Iacono, 2008), the role of adoption status should also be tested with respect to these proposed associations.

### **Family Interactions**

As previously mentioned, general population-based research over the past few decades has firmly established an association between the quality of parent-child interactions and adolescent adjustment (Reiss, 2000; Steinberg, 2001). Specifically, open, warm, and firm (and developmentally appropriate) parent-child interactions are associated with positive adjustment outcomes. Conversely, conflictual parent-child interactions are associated with poorer adjustment and more problem behaviors (Eisenberg et al., 2008; El-Sheikh & Elmore-Staton, 2004; Smetana, 1996). Researchers agree that high levels of conflict (defined as frequent, high intensity conflict) are not beneficial to adolescent externalizing outcomes (Deković, 1999; Smetana, 1989).

Research examining family communication based on varying levels of genetic relatedness is limited to a handful of studies. The most consistent finding in these studies is that adoptive family communication is characterized as less warm and more conflictual compared with non-adoptive families (Lansford et al, 2001; Rosnati & Marta, 1997; Rueter, Keyes, Iacono, & McGue. 2009). For instance, Lansford et al. (2001) found that adoptive mothers reported more parent-child disagreements than non-adoptive mothers. Similarly, Rueter et al. (2009) found higher parent-adolescent conflict levels in adoptive families than in non-adoptive ones.

Despite the limited research examining differences in family interactions based on adoption status, two things should be pointed out. First, both Lansford et al. (2001) and Rueter et al. (2009) were descriptive and did not test family processes that might account for the difference in conflict levels based on adoption status. As previously mentioned, Koh & Rueter (2011) provide an important starting point for considering the role of conflict in a larger family process (as the present study does) with respect to adoption status. Second, in the Rueter et al. (2009) study, statistically significant differences in the adoptive compared with non-adoptive families were limited to observed adolescent behavior directed toward each parent (and not vice versa). This provides justification for focusing solely on adolescent conflictual behavior directed toward each family member in the personality-initiated family process (see Figure 2).

### **Adoption Status**

Personality, family communication, adolescent conflict, and adolescent externalizing behavior all have some degree of heritability. As previously discussed,

personality is heritable (Krueger et al., 2008). Underlying cognitive processes associated with communication, such as shared values, attitudes, and beliefs, also have a genetic foundation (Abrahamson, Baker, & Caspi, 2002; Alford, Funk, & Hibbing, 2005; Olson, Vernon, Harris, & Jang, 2001; Tesser, 1993). These genetic effects (e.g., for attitudes) are not limited to adults and have been found in children as young as 12 years old (Abrahamson, Baker, & Caspi, 2002). Behavior genetics research also found a biological basis for both the association between parent-child conflict and externalizing outcomes (Burt, Krueger, McGue, & Iacono, 2003; Burt, McGue, Krueger, & Iacono, 2005), and externalizing behaviors (Burt et al., 2007). Because all of these constructs have a genetic basis, and adoptive parents and children do not share genetic relations, it is important to understand the role of adoption status in the proposed processes (see Figures 1 and 2).

### **The Present Study**

The present study tested the study's central hypothesis as depicted in a conceptual model (see Figure 1) and a specific family process model (see Figure 2). Conceptualized within a goodness of fit, person-environment transactional, and FCPT framework, the present study hypothesized that both DTF and adoption status would have an effect on the overall proposed process. Figure 1 depicts a broad conceptual process involving adolescent and parent personality, family communication, adolescent conflict, adoption status, and adolescent externalizing behavior. Figure 2 depicts a more specific family process whereby two personality-initiated processes (adolescent aggression and parent alienation) were expected to contribute to a complex family communicative process that explained variance in adolescent externalizing behavior. Use of an adoptive and non-

adoptive family sample allowed for a comparison between children and parents that do and do not share genetic relations. Finally, due to the complexity of the Figure 2 model and the number of models tested, this study only utilized data from one time point.

## **Method**

### **Participants**

Data for this study were from the Sibling Interaction and Behavior Study (SIBS; McGue et al., 2007), a longitudinal study that examines sibling and family influences on adolescent outcomes. Participating families at intake ( $N = 617$ ) had at least one parent and two adolescent siblings with a maximum five-year age difference. The present study used data from the mothers ( $M_{\text{age}} = 45.56$ ,  $SD = 4.23$ ), fathers ( $M_{\text{age}} = 48.23$ ,  $SD = 4.42$ ), and elder sibling ( $M_{\text{age}} = 16.14$ ,  $SD = 1.5$ ). In 384 families, the elder sibling was adopted (International adoptions:  $n = 252$ , 66% Asian). In 231 families, the elder sibling was the biological offspring of both parents. All parents were predominantly middle class and Caucasian. Two adolescents were deemed ineligible (one due to a biological relation between an adoptive adolescent and sibling, and another due to a developmental disability). Therefore, both families with ineligible adolescents were removed, resulting in a final sample of 615 families.

Eligible families were required to have participating adopted children placed before two years of age ( $M = 4.7$  months,  $SD = 3.4$  months), no special needs children, and live within driving distance of the university. Families with adopted children were recruited from three adoption agencies. Families with biological children were recruited through state birth records. The study sample is generally representative of two-parent

families with two or more children in the university's metropolitan region (McGue et al., 2007).

### **Procedures**

Using university Institutional Review Board (IRB) approved procedures, all participating families completed informed consent, self-report questionnaires, and two five-minute videotaped family interaction tasks during a half-day visit to the Minnesota Center for Twin and Family Research (MCTFR). Family members also completed mailed personality questionnaires prior to the in-person interview. For the videotaped family interactions, all family members were seated around a table in a room decorated to look like a living/dining room. Discussions were recorded by an inconspicuously placed video camera. Tasks were explained to the family by a trained interviewer, who left the room during videotaping. The first task consisted of a family attempt to reach consensus about a Rorschach inkblot; for the second task, the family attempted to resolve a moral dilemma.

### **Measures**

*Personality traits* were assessed using the Multidimensional Personality Questionnaire (MPQ; Tellegen & Waller, 2008) for mothers and fathers, or the Personality Booklet – Youth Abbreviated (PBYA; Tellegen & Waller, 2008) for adolescents. The MPQ is a 198-item, factor-analytically developed, self-report measure of higher and lower order personality traits; it measures all aspects of the Big Five with the exception of Intellect (Markon, Krueger, & Watson, 2005). Importantly, it measures constructs of interest to the present study. The PBYA is a shortened, 133-item version of

the MPQ for adolescents under 16 years of age. All questionnaire items used a 4-point scale (*1 = definitely false to 4 = definitely true*) and were reverse coded as necessary so that high scores reflect high levels of a given trait.

Mother, father, and adolescent traits assessed included aggression and alienation. *Aggression* measures proclivities toward physical/cognitive aggression and includes items such as “When someone hurts me, I try to retaliate (get even),” “When I get angry, I am often ready to hit someone,” and “If people criticize me, I usually point out their weaknesses.” *Alienation* measures feelings of estrangement/victimization and includes items like “Some people oppose me for no good reason,” “People often try to take advantage of me,” and “I am almost always treated unfairly.” Measurement properties for all scales were acceptable (Tellegen & Waller, 2008). Internal consistency of the aggression ( $\alpha = .77$  to  $.88$ ) and alienation ( $\alpha = .81$  to  $.87$ ) scales has been tested across four college and community samples (Tellegen & Waller, 2008). Internal consistency was also examined using the study sample: aggression (adolescents,  $\alpha = .80$ ), alienation (mothers,  $\alpha = .80$ ; fathers,  $\alpha = .88$ ).

*Adolescent conflict*, defined as hostile, angry, and coercive adolescent behavior directed toward each parent, was assessed as a latent concept using observer ratings from the Sibling Interaction and Behavior Rating Scales, adapted from the Iowa Family Interaction Rating Scales (IFIRS; Melby & Conger, 2001). In addition to 100 hours of training, observers were required to pass observation and written examinations before independently coding, and attend biweekly coder meetings to prevent “rater drift.” Inter-rater reliability was assessed in a two-step process: (1) randomly selected secondary

observers rated 25% of all interactions and, (2) primary and secondary ratings were compared using interclass correlations (ICC; Shrout & Fleiss, 1979; Suen & Ary, 1989).

Observers globally rated (*1 = not at all characteristic to 9 =mainly characteristic*) adolescent *hostility* (hostile, angry, and critical behavior) toward the mother (ICC = .73) and father (ICC = .71) and adolescent *angry coercion* (attempts to control and/or change behavior or opinions marked by anger and contempt) toward the mother (ICC = .65) and the father (ICC = .67). These variables were indicators of the adolescent conflict latent variable.

*Individual-level family communication* was defined as frequent, open, and unconstrained *Conversation* oriented behavior, as conceptualized by FCPT. It was assessed using trained observers' global ratings of dyadic (e.g., adolescent to mother, father to adolescent, etc.) family interaction tasks from the Sibling Interaction and Behavior Rating Scales (SIBRS; adapted from the Iowa Family Interaction Rating Scales, Melby & Conger, 2001) as described above.

Factor scores (resulting from a factor analysis) from the *Warmth*, *Listening Responsiveness*, and *Communication* ratings were used as indicators of each family member's observed behavior on the *Conversation* dimension. *Warmth* is defined as the expression of care, concern, support, or encouragement (ICCs ranged from .37 to .72); *Listening Responsiveness* is defined as verbal or nonverbal listener responsiveness indicating attentiveness (ICCs ranged from .34 to .63) and; *Communication* is clear/appropriate, neutral or positive expression of point of view, needs, and wants (ICCs ranged from .60 to .75). Factor scores are composite variables comprised of each

individual's observed score placement on a latent factor (Tabachnick & Fidell, 2007). For example, the mother *Warmth* factor score consisted of the mother to father, mother to elder, and mother to younger *Warmth* observer ratings. To create the mother *Conversation* latent variable, mother *Warmth*, *Listening Responsiveness*, and *Communication* factor scores were indicators of the mother *Conversation* latent variable. The use of factor scores as indicators of the *Conversation* latent variable allowed this variable to represent a second-order latent structure.

*Adolescent externalizing behavior* was defined as antisocial, aggressive or delinquent behavior in multiple contexts including home, school, and community; it was assessed as a latent construct with three indicators. Adolescents used the Delinquent Behavior Inventory (DBI; Gibson, 1967), to report how often they engaged in 36 behaviors, including "using any kind of weapon in a fight," "smashing, slashing, or damaging things," "cutting classes at school," "stealing things," ( $1 = \textit{never}$ ,  $2 = \textit{once}$ , and  $3 = \textit{more than once}$ ). Responses were summed to create the first adolescent externalizing indicator ( $\alpha = .84$ ).

Symptom counts from the Diagnostic Interview for Children and Adolescents – Revised (DICA-R; Welner, Reich, Herjanic, Jung, & Amado, 1987) formed the second adolescent externalizing indicator. Trained interviewers separately administered the DICA-R to both adolescents and mothers. Using a "best estimate" method, a symptom was considered present if one or the other reported it; if both reported it, the symptom was only counted once. All adolescent or mother-reported attention deficit hyperactivity disorder (ADHD), conduct disorder (CD), and oppositional defiant disorder (ODD)



symptoms were summed. As per Iacono, Carlson, Taylor, Elkins, & McGue, (1999), this method yielded acceptable kappa reliabilities: ADHD ( $k = .77$ ), ODD ( $k = .71$ ), and CD ( $k = .81$ ).

The third indicator of adolescent externalizing consisted of a 47-item adolescent externalizing in-class behavior checklist adapted from Conners' Teacher Rating Scale (Conners, 1969) and the Rutter Child Scale B (Rutter, 1967). Three teachers were nominated by each adolescent, contacted, and asked to complete the survey. The teacher response rate of 78% was not correlated with adolescent gender or adoption status. Items were rated on a 4-point scale ( $1 = not\ at\ all\ characteristic$  to  $4 = very\ much\ characteristic$ ) and included "is defiant," "has difficulty concentrating on schoolwork," "is often truant," "initiates physical fights," and "obeys the rules" (reverse coded). Each teacher's responses were summed (Range: 49 to 158.7,  $\alpha = .97$ , Spearman-Brown inter-teacher reliability = .82). The mean of each adolescent's teacher reports was used as the third indicator of the latent factor.

### **Analysis Plan**

The research questions posed in this study are based on the central hypothesis that adolescent and parent personality contribute to a process involving communication, adolescent conflict and adolescent externalizing behavior, and that this process differs in adoptive and non-adoptive families. RQ1 and RQ4 are conceptual and are not associated with specific hypotheses. The single-headed arrows depict all study hypotheses; each arrow is associated with RQ2, RQ3, or RQ5 (see key in Figure 2). Due to the complex associations proposed among multiple dependent variables and latent concepts, study

hypotheses were tested using structural equation modeling (SEM). Consistent with the actor-partner interdependence model (APIM; Kenny et al., 2006), separate mother-adolescent and father-adolescent models were tested. In all models, residuals among the indicators for the adolescent and parent *Conversation* and adolescent conflict latent variables were allowed to correlate. Data were screened for normality, outliers, and multicollinearity prior to conducting analyses (Kline, 2005); no violations of assumptions were found.

Model fit was evaluated by the statistical significance of the  $\chi^2$  (Bollen, 1989), comparative fit index (CFI) and Tucker-Lewis index (TLI) above .90, standardized root mean square residual (SRMR) less than .08, and root mean square error of approximation (RMSEA) less than .06 (Hu & Bentler, 1999). Although technically a non-significant  $\chi^2$  indicates a good model fit, well-fitting models often include a statistically significant  $\chi^2$  due to its sensitivity to sample size. Analyses were conducted using Mplus 6.11 (Muthén & Muthén, 1998-2011).

The goal of RQ1 was to determine if there was support for the study's central hypothesis depicted by the conceptual model in Figure 1. Answering RQ1 required one step:

- RQ1: *Conceptual Process model* – Adolescent aggression, parent alienation, adolescent and parent communication, and adolescent conflict were each regressed on adolescent externalizing behaviors in separate mother-adolescent and father-adolescent models. This determined if the overall theoretical process was supported (see Figure 1).

RQ2 sought to test all actor (or main) effects. It required two steps:

- RQ2 Step 1: Base (or control) model – All observed and latent constructs were regressed on adolescent age, adolescent gender, and adoption status. This helped determine the amount of variance in each latent construct due to age, gender, and adoption status.
- RQ2 Step 2: Actor effects (or main) model – The same constructs (with the exception of adoption status) were each regressed on adolescent externalizing behaviors.

The purpose of RQ3 was to determine whether one family member's trait was associated with another member's communicative behavior; it required one step:

- RQ3: Partner effects model – Parent *Conversation* was regressed on adolescent aggression, and adolescent *Conversation* was regressed on parent alienation to determine if there was a partner effect for one family member's trait on another member's communication orientated behavior.

RQ4 sought to determine if dyadic trait fit (between adolescent aggression and parent alienation) had an effect on the overall process. To answer this question, two steps were involved:

- RQ4 Step 1: DTF Interaction model 1 – Adolescent externalizing behavior, adolescent conflict, and adolescent *Conversation* were regressed on the parent alienation X adolescent aggression interaction term. This step helped determine if there was a moderating effect of parent alienation on the magnitude of the relationship between adolescent aggression and

adolescent behavior (communication, conflict, and externalizing behavior).

- RQ4 Step 2: DTF Interaction model 2 – *Parent Conversation* was regressed on the adolescent aggression X parent alienation interaction term. This final step helped determine if there was a moderating effect of adolescent aggression on the relationship between parent alienation and parent behavior (communication).

Finally, the goal of RQ5 was two-fold: (a) to determine if there were any additive effects of adoption status above and beyond all actor (or main) and partner effects tested in RQ2 and RQ3 and, (b) to determine if there were differences in adoptive and non-adoptive families with respect to adolescent conflict and adolescent externalizing. Due to the complexity of the models and the proposed analysis plan, the interaction terms tested in the RQ4 models (steps 1 and 2) were not included in the RQ5 models. Answering RQ5 involved three steps:

- RQ5 Step 1: Adoption status main effects model – Adoption status was added to the model before testing any moderating effects of adoption status. This helped determine if adoption status explained any variance above and beyond all actor (or main) and partner effects tested in RQ2 and RQ3.
- RQ5 Step 2: Adoption status interaction model 1 – The effect of adolescent aggression X adoption status on adolescent *Conversation* and adolescent conflict orientation was tested. Doing so helped determine if

adolescent aggression moderated the magnitude of the relationship between adoption status and adolescent *Conversation*.

- RQ5 Step 3: Adoption status interaction model 1 – The effect of parent alienation X adoption status was tested to determine if parent alienation moderated the magnitude of the relationship between parent alienation and parent *Conversation*.

### **Missing Value Analysis (MVA)**

Seventy percent of the 615 study families had complete data on all study variables. Missing data were primarily due to (a) missing teacher reports of externalizing behavior (31%) and, (b) fathers who either did not complete the MPQ (Tellegen & Waller, 2008; 11%) or did not participate in the observation tasks (25%). All other study variables had no more than 2% missing data.

The last decade of missing data research reflects a general consensus that reliable estimation procedures (e.g., full information maximum-likelihood, FIML) are preferred over other methods (e.g., case deletion) when estimating missing values (Acock, 2005; Johnson & Young, 2011; Schafer & Graham, 2002). Moreover, simulation studies demonstrate that FIML estimation is reliable with as much as 50% or more missing values (Allison, 2001; Collins et al., 2011; Johnson & Young, 2011).

Because most of the missing data were due to missing teacher reports and father participation, these data were further examined. First, mean values for externalizing behavior measures were compared for adolescents (a) whose father did or did not participate in the observation tasks and, (b) who did or did not have teacher report data.

T-test revealed no statistically significant differences based on father participation. Adolescents without teacher report data however, reported significantly higher externalizing behaviors ( $t = 3.12, p < .001$ ) and externalizing symptoms ( $t = 4.11, p < .001$ ). Second, to examine the possibility of biased results due to inflated standard errors resulting from violations to data missing at random, the conceptual process model (see Figure 1) was tested with and without missing data. For every hypothesis depicted in Figure 1, the pattern of findings was similar, although the smaller sample produced fewer statistically significant results.

Mplus estimates missing data by adjusting model parameter estimates using full-information maximum-likelihood estimation (FIML; Muthén & Shedden, 1999; Schafer & Graham, 2002). Reliable estimation requires that the proportion of available data for each study variable and between each pair of variables be at least .10. These proportions ranged from .74 to 1.00, with the vast majority above .88. Therefore, FIML was used to estimate missing data.

## **Results**

### **Preliminary Analyses**

T-tests were conducted to test for possible differences in aggression and alienation for adoptive and non-adoptive adolescents and parents. No statistically significant differences were found. Means, standard deviations, and correlations for all study variables are reported in Table 1.

### **Hypothesis Testing**

All hypothesized associations depicted in Figure 2 were tested for the mother-adolescent and father-adolescent models and are presented accordingly. Overall, patterns of model fit statistics (see Table 2), explained variance (see Table 3), and statistically significant associations (see Tables 4 to 11) supported this study's central hypothesis. Factor loadings were also acceptable in all models tested (see Table 12).

### **RQ1 Findings**

*Conceptual process model.* In the mother-adolescent model, all hypothesized paths were statistically significant, indicating full support for the Figure 1 theorized process (see Table 4). Conversely, the father-adolescent model was not fully supported. While father alienation and father *Conversation* orientation were negatively associated ( $\beta = -.19, t = -4.24, p < .01$ ) in the father-adolescent model, father alienation was not associated with either adolescent conflict or adolescent externalizing behavior.

### **RQ2 Findings**

*Base (or control) model.* At step 1, age, gender, and adoption status produced nearly identical associations with each latent construct in both models (see Table 5). For instance, age ( $\beta = .27, t = 5.86, p < .01$ ), gender ( $\beta = -.43, t = -10.20, p < .01$ ), and adoption status ( $\beta = -.15, t = -3.18, p < .01$ ) explained nearly a quarter of the variance in adolescent externalizing behaviors ( $R^2 = .24, t = 6.10, p < .01$ ).

*Actor effects model.* At step 2, as shown in Table 6, both mother-adolescent and father-adolescent models produced statistically significant increases in  $R^2$  for all latent constructs. For example, in the mother-adolescent model, there was a  $\Delta R^2 = .29$  for the adolescent externalizing behavior ( $\Delta\chi^2 = 60.05, p < .01$ ).

### **RQ3 Findings**

*Partner effects model.* For both mother- and father-adolescent models, adolescent aggression was associated with each parent's *Conversation* orientation (mother-adolescent:  $\beta = -.09, t = -5.26, p < .05$ ; father-adolescent:  $\beta = -.11, t = -2.35, p < .05$ ; see Table 7). There were no statistically significant increases in  $R^2$  for any of the latent constructs in both models.

As shown in Table 8, several indirect effects were found in both the mother- and father-adolescent models. For instance, in the mother-adolescent model, adolescent aggression had an indirect effect on adolescent conflict ( $\beta = .09, t = 3.68, p < .001$ ) and adolescent externalizing behaviors (through adolescent conflict and adolescent *Conversation*;  $\beta = .02, t = 2.74, p < .01$ ). Additionally, both adolescent *Conversation* ( $\beta = -.08, t = -3.25, p < .001$ ) and mother *Conversation* ( $\beta = .05, t = 2.61, p < .01$ ) had an indirect effect on adolescent externalizing behaviors.

In the father-adolescent model, adolescent aggression had an indirect effect on both adolescent externalizing behavior (through adolescent conflict and adolescent *Conversation*;  $\beta = .02, t = 2.62, p < .01$ ) and adolescent conflict ( $\beta = .06, t = 3.11, p < .01$ ). There was also an indirect effect of adolescent *Conversation* on adolescent externalizing behaviors ( $\beta = -.06, t = -3.14, p < .01$ ).

### **RQ4 Findings.**

*DTF interaction models.* Support for moderating effects for parent alienation were only found in the mother-adolescent model whereby mother alienation moderated the magnitude of the relationship between adolescent aggression and (a) adolescent



*Conversation* ( $\beta = -.09, t = -2.16, p < .05$ ), and (b) adolescent externalizing behavior ( $\beta = .08, t = 1.99, p < .05$ ; see Table 9).

### **RQ5 Findings.**

***Adoption status main effects model.*** This model tested whether adoption status added any additional variance in the latent constructs above and beyond actor (or main) or partner effects tested in *RQ2* and *RQ3*. This model did not include any interaction terms; instead, each interaction term was tested separately (see below). In the mother-adolescent model, there was a .01 minimal increase in explained variance ( $R^2$ ) in adolescent externalizing behavior; there was no increase in explained variance ( $R^2$ ) in adolescent externalizing behavior for father-adolescent model. Both models had small statistically significant increases in explained variance ( $R^2$ ) in adolescent *Conversation* and adolescent conflict. In the father-adolescent model, there was a small .01 statistically significant increase in explained variance ( $R^2$ ) in father *Conversation* ( $\Delta R^2 = .01; \Delta\chi^2 = 67.06, p < .01$ ; see Table 10).

***Adoption status interaction models.*** In both the mother- and father-adolescent models, adoption status moderated the magnitude of the relationship between adolescent aggression and adolescent conflict (mother-adolescent:  $\beta = -.15, t = -3.50, p < .001$ ; father-adolescent:  $\beta = -.15, t = -3.44, p < .001$ ; see Table 11), but not between adolescent aggression and adolescent *Conversation*. In both dyadic models, there was a statistically significant increase in explained variance ( $R^2$ ) for adolescent conflict (mother-adolescent:  $\Delta R^2 = .02; \Delta\chi^2 = 33.50, < .01$ ; father-adolescent:  $\Delta R^2 = .02; \Delta\chi^2 = 32.83, p < .01$ ). This interaction term for parent alienation X adoption status was not statistically significant in

either parent-adolescent dyadic model.

## **Discussion**

To better understand the small but noteworthy risk for externalizing behaviors for adopted youth, the present study tested a complex family process involving personality and family interactions as an explanation of adopted adolescent adjustment. Overall, findings supported the personality-initiated family process and the study's central hypothesis. Indeed, the dyadic trait fit (DTF) between adolescent aggression and parent alienation had an effect on a family interactive process that explained substantial variance in adolescent externalizing behavior. The direct associations among study constructs explained the most variance (and accounted for the largest increases in variance) in adolescent *Conversation*, parent *Conversation*, adolescent conflict, and adolescent externalizing behavior. Moreover, direct associations between adoption status and (a) conflict and (b) externalizing appear to be far more complex than previous research has suggested.

### **The conceptual process**

The conceptual process alone revealed a differential parent involvement pattern and explained substantial variance in adolescent externalizing behaviors. For mother-adolescent dyads, all hypothesized paths were statistically significant (see Figure 2) – suggesting that mother alienation played a role throughout the overall family process that contributed to their child's adjustment. This full support for the conceptual process was not found for father-adolescent dyads. Instead, father contributions were limited to the interdependent relationships among adolescent aggression, father alienation, and

adolescent and father *Conversation* behavior. Father alienation was not directly associated with either adolescent conflict or adolescent externalizing behavior. This is the first study to suggest a differential parent involvement pattern in adoptive family processes.

This differential parent involvement pattern revealed in the overall conceptual process is consistent with general population research that has found that mothers (compared with fathers) are more involved with their children (Gryczkowski, Jordan, & Mercer, 2010; Harris & Morgan, 1991; Yeung, Sandberg, Davis-Kean, & Hofferth, 2001). Factors such as parent and child gender (Hawkins, Amato, & King, 2006; Raley & Bianchi, 2006), parenting styles (Jain, Belsky, & Crnic, 1996; Simons & Conger, 2007), relationship quality (Harris, Furstenberg, & Marmer, 1998; Krishnakumar & Black, 2003), and residential status (Hawkins et al., 2006) explain differential parent involvement in the general population. Research also clearly supports an association between parental involvement and child adjustment (Bronte-Tinkew, Moore, & Carrano, 2006; Flouri & Buchanan, 2003; King & Sobolewski, 2006; Marsiglio, Amato, Day, & Lamb, 2004). Furthermore, general population research suggests that the father-adolescent relationship independently contributes (above and beyond the mother-adolescent relationship) to variance in child adjustment (Videon, 2005).

Logic follows that the same is true in adoptive populations: that there is an association between parent involvement and child adjustment, and that the father-adolescent relationship uniquely contributes to child adjustment. Yet, as we know, little is known about family processes that contribute to adoptive child adjustment. Future

research should examine if mother and father involvement differs in adoptive family processes and, if so, the potential ramifications of any differential involvement patterns. Recent general population research indicating that father-involvement is on the rise further highlights the need to determine if mother and father involvement differs in adoptive families (Yeung et al., 2001). Future investigations should also account for a mutually interdependent adoptive family relationship context, as developmentalists now recognize that father-child relationships should be contextualized within a reciprocal framework (Marsiglio, Amato, Day, & Lamb, 2004).

### **Utility of the Theoretical Framework**

The proposed theoretical framework for the personality-initiated communicative family process that contributed to externalizing behaviors (Figure 2) was supported. Goodness of fit theory (Lerner, 1993; Thomas & Chess, 1977) situated the role of personality and dyadic trait fit (DTF; Koh et al., 2012) in the overall process. Transactional theory (Caspi et al., 1987, 1988; Scarr & McCartney, 1983) and FCPT (FCPT; Koerner & Fitzpatrick, 2002a, 2000b, 2004, 2006) explained how family interactions contributed to a family process that explained substantial variance in externalizing behaviors. Finally, the actor-partner interdependence model (APIM; Kenny et al., 2006) provided methodological guidance for testing interdependent parent-adolescent processes.

With the exception of the statistically significant negative association between mother *Conversation* and adolescent conflict, all associations were in the expected direction – suggesting that the overall family process mostly operated as the theoretical

framework surmised and, in one case, strengthened it. Specifically, FCPT was strengthened by study findings supporting the expectation that personality would help explain why family members communicate. Per FCPT, as expected, adolescent aggression and parent alienation were negatively associated with their own *Conversation* behavior, such that higher levels of aggression and alienation were each associated with lower levels of their own warm, open, and responsive *Conversation*. In addition to Koh, Koerner et al. (2012), the present study is only one of two studies (using the same data set) to support these associations. Future research needs to replicate and confirm the finding that, indeed, personality may help to explain FCPT conceptualized behavior.

A theoretically unexpected association between mother *Conversation* and adolescent conflict was revealed in the mother alienation-initiated process. Per goodness of fit and DTF, warm, open, and responsive *Conversation* was expected to offset the negative effects of mother alienation and adolescent conflict. A negative association between *Conversation* behavior (warm, open, and responsive communication) and adolescent conflict, such that higher levels of *Conversation* were associated with lower levels of conflict, would have supported this premise. Instead, the opposite was true. Adolescent conflict levels increased along with the warm, open, and responsive *Conversation* behavior mothers exhibited toward their adolescents.

This paradoxical association is suggestive of a double bind. Per Bateson, Jackson, Haley, & Weakland (1956) a double bind is defined as a complex, paradoxical communicative dilemma that offers no workable solution, and no perceived opportunity to exit the situation. Bateson and colleagues (1963) applied their double bind concept to

family environments where one or more family members are “caught in an ongoing system which produces conflicting definitions of the relationship and consequent subjective distress” (Bateson, Jackson, Haley, & Weakland, 1963, p. 155).

Existing family research has not yet examined the potential ramifications of a double bind in parent-adolescent relationships on child adjustment. In fact, little is known about double binds in the family context. The few studies that have examined the double bind concept in a family context are qualitative and exploratory. For instance, Campbell & Handy (2011) and Climo, Terry, & Lay (2002) used the double bind concept as an interpretive theoretical framework for understanding intergenerational issues in custodial grandparent caretaking. The consequences of the emotionally distressing double bind were not examined.

Logically, situations that are characterized as unworkable, inescapable, or distressful would be expected to have unfavorable effects on psychological well-being. A study examining double binds in an organizational context, however, suggests that the paradoxical and contradictory nature of a double bind may not necessarily have negative effects. Specifically, employee management of the contradictions and tensions characteristic of a double bind rendered positive and negative outcomes (Tracey, 2004).

With this example in mind, it is reasonable to expect that management of double bind situations in parent-child relationships could also render positive or negative child adjustment outcomes. For instance, strong parent-child relationships can likely withstand the emotional distress and tension characteristic of a double bind. In this hypothesized scenario, a double bind may not have negative consequences on child adjustment.

Conversely, poor parent-child relationships may be more susceptible to a double bind situation and have an adverse effect on child functioning. Future research should test the plausibility of this logic and further explore the ramifications of double bind situations on child adjustment.

### **Personality**

Study results support the premise that personality contributed to the overall process in two ways. First, interdependent processes revealed in both parent-adolescent models suggested that the dyadic trait fit (DTF) between adolescent aggression and mother alienation played a role in the overall family interactive process that explained substantial variance in adolescent externalizing behavior. Specifically, for mother-adolescents, adolescent aggression was negatively associated with adolescent *Conversation* (actor effect), and with parent *Conversation* (partner effect), such that lower levels of aggression were associated with higher adolescent and parent *Conversation* levels. These co-occurring actor and partner effects were in the same direction and suggest that, with respect to this study's proposed process, adolescents (compared with either parent) were more dyadic-oriented.

Although parent-child relationships have been examined using the APIM (Pesonen, Räikkönen, Heinonen, Järvenpää, & Strandberg, 2006; Rasbash, Jenkins, O'Connor, & Tackett, 2011), they are studied with markedly less frequency than couple relationships. Consequently, little is known about the effects (if any) of a (a) parent-child compensatory pattern or (b) dyadic relationship (compared with individual) orientation on child adjustment. Both areas are open for further investigation.

Second, statistically significant mother alienation moderating effects lend further support to the notion that DTF played a role in the larger family process and in influencing adolescent functioning (see Figure 2). Mother alienation moderated the magnitude of the relationship between adolescent aggression and adolescent *Conversation*. Specifically, high levels of mother alienation had a dampening effect, or weakened, the strength of the relationship between adolescent aggression and adolescent *Conversation* (see Figure 3). Recall that alienation measures feelings of estrangement and victimization, and is essentially a measure of trust; thus, higher alienation reflects lower trust.

Although Koh, Davis et al. (2012) suggested preliminary support for DTF, this is the first study to demonstrate support vis-à-vis an adolescent aggression X mother alienation interaction effect. Consistent with an incremental approach to testing all aspects of the conceptual model involving personality, family interactions, adoption status, and child adjustment (see Figure 1), future research should test interaction effects between other contributing personality traits.

### **Adoption status**

The addition of adoption status to the overall process highlights two areas that warrant further investigation. First, similar to the differential parent involvement pattern revealed in the conceptual process, adoption status contributed differently (beyond the proposed process) based on the parent-adolescent subsystem. With respect to the overall process, externalizing behavior was salient for adopted adolescent-mother dyads, while adolescent *Conversation* and adolescent conflict were salient for adopted adolescent-



father dyads.

Specifically, for mother-adolescent dyads, being adopted (versus not adopted) made more of a difference for externalizing behavior. That is, consistent with previous research (Feigelman, 2002; Haugaard, 1999; Keyes et al., 2008), higher levels of externalizing behavior were associated with adopted adolescents; this statistically significant association accounted for a very small increase in explained variance in externalizing behavior. Contrary to previous research, this was not the case for the father-adolescent dyads. Namely, the direct association between adoption status and externalizing behavior was not statistically significant, and adoption status did not contribute any additional explained variance in externalizing behavior.

Adoption-specific factors such as openness in adoption (Brodzinsky, 2005; Dunbar et al., 2006; von Korff, Grotevant, & McRoy, 2006), satisfaction with openness (Grotevant et al., 2011), and preoccupation with adoption (Kohler, Grotevant, & McRoy, 2004) likely influence adoptive family relationships and may help explain contrasting adoptive parent contributions to the overall process. For example, a descriptive study by Kohler et al. (2004) found that adoptee preoccupation (or thought frequency) with their adoption influenced perceptions of their relationship with one or both adoptive parents. In the case of high preoccupation levels, adoptees reported higher feelings of alienation (compared with moderate to low levels) toward their adoptive fathers. Accordingly, such feelings could account for the different parent-adolescent dyadic patterns found in this study. Using the Figure 1 conceptual model as a heuristic, inquiries of this nature should draw on empirically established adoption-specific family factors (e.g., Grotevant et al.,

2006; Kohler et al., 2002) to better understand how they influence parent contributions in a family process that explains adoptive child adjustment.

Second, the addition of adoption status to the overall process underscored adolescent conflict in the tested explanatory family process. Specifically, adoption status moderated the magnitude of the relationship between adolescent aggression and adolescent conflict for both parent-adolescent dyads. In both parent-adolescent models, being adopted markedly strengthened the positive association between adolescent aggression and adolescent conflict. In contrast, for non-adopted adolescents, the association between adolescent aggression and adolescent conflict nearly flattened out (see Figure 4). This moderating effect contributed to an additional 2-3% variance explained in adolescent conflict. Moreover, it is important to note that the observational tasks (i.e., Rorschach inkblot consensus and moral dilemma resolution) used to measure the latent adolescent conflict variable were not designed to elicit conflict. Yet still adolescent conflict emerged as a salient factor in the overall process. This is consistent with just a few studies that have also found conflict to be salient in adoptive families (e.g., Lansford et al., 2001; Koh & Rueter, 2011; Rueter et al., 2009).

Given the dearth of studies on conflict in adoptive families, prospective research efforts should examine the nature and function of conflict in adoptive families. Such research should be informed by existing general population studies, which have noted that conflict is inherently paradoxical and can lead to both deleterious and beneficial outcomes (Laursen & Hafen, 2010). General agreement exists that frequent, high intensity parent-child conflict is harmful to adolescent development (Deković, 1999;

Laursen & Hafen, 2010; Smetana, 1996). However, in the context of positive relationships, growth may occur through identity processes (Laursen & Hafen, 2010; Lichtwarck-Aschoff, van Geert, Bosma, & Kunnen, 2008). Regardless of different parent and adolescent perceptions of and meanings assigned to conflict (Sillars, Smith, & Koerner, 2010; Steinberg, 2001), conflict may be part of this individuation and identity process. Notably, identity development may be particularly challenging for adopted adolescents who may have limited information about their birth parents and/or cultural origins (Brodzinsky, Schechter, & Henig, 1992; Grotevant & von Korff, 2011; Lee, 2003).

### **Weaknesses**

Weaknesses to this study should be acknowledged. First, this study is cross-sectional and subsequently, cannot establish the direction of effects. However, recent empirical research that has established that conflict predicts externalizing behaviors (Klahr, McGue, Iacono, & Burt, 2011; Klahr, Rueter, McGue, Iacono, & Burt, 2011) provides strong justification for the direction of effects between conflict and externalizing proposed in this study (see Figure 2).

Since we know that personality is largely heritable (Krueger, South, Johnson, & Iacono, 2008) and stable across time (Johnson, McGue, & Krueger, 2005; Kandler et al., 2010), it is reasonable to presume that personality exists before the expression of warm, responsive, and communicative behaviors in families. Additionally, adoptees in the present study were adopted before two years of age. Thus, adoptive status also likely existed before the expression of warm, responsive, communicative behaviors. Together, it

is logical to expect the direction of effects as proposed in Figure 1. Future research should include individual-level communicative behavior and adolescent conflict at multiple time points (with meaningful time lags) in a longitudinal design to confirm the direction of effects proposed in Figure 1.

Finally, statistically significant explained variance in the Figure 2 latent constructs ranged from small (4%) to large (55%). Per Cohen (1992), explaining 55% in a given construct is considered to be a large effect size. Increases in explained variance, however, were notably small. After the initial, and in some cases substantial increases in explained variance (2% to 29%), subsequent increases were notably small (1% to 4%), although in most cases they were statistically significant. However, given the heritability in most of the Figure 2 latent constructs, the process tested explains a respectable amount of variance in adolescent communication and adolescent conflict. In the case of adolescent externalizing behaviors, a large amount of variance is explained.

### **Strengths**

There are several noteworthy strengths of this study. To start, this is the first study to test such a complex family process using a large sample of both adoptive and non-adoptive families. Most adoption research uses adoptive family-only samples, precluding them from making comparisons. Second, this study used data from multiple family members: mothers, fathers, and adolescents. Third, two data sources were used. Personality was assessed using each family members' self-report; family communication and adolescent conflict were measured using observational data. Use of these data sources accomplished two things: (1) to fill a gap in our knowledge of the relationship

between self-reported personality and actual behavior (Back, Schmukle & Egloff, 2009) and, (2) to reduce shared method variance (Bennett et al. 2012; Jones & Miller, 2011). The latter was accomplished in two ways. Some method variance was reduced with the use of multiple reporters in the adolescent externalizing behavior measure. Use of observational data also reduced method bias in its associations with self-reported individual traits. This method variance reduction increased overall confidence in the study findings. Finally, use of the APIM was a significant strength of the study. It allowed study analyses to statistically account for non-independent data (Kenny & Ledermann, 2012). Important for family research, it extended the level of analysis from the individual to the dyadic level.

### **Limitations to Generalizability**

Limitations to this study's generalizability should be noted. First, this study used an adolescent sample. Therefore, it is unknown if this process operates in families with younger or older children. Future research should test the Figure 1 and 2 processes with these populations. Second, generalizability is limited to children placed for adoption prior to two years of age. The processes proposed in this study may operate differently for children adopted at an older age. Research suggesting that there is a negative association between age at adoption and adjustment (Gleitman & Savaya, 2011; van Londen, Juffer & van IJzendoorn, 2007) provides justification for testing the Figure 1 and 2 processes with this population. Third, the vast majority of the study sample consisted of children in two-parent, heterosexual families. Yet a growing number of same sex couples are adopting children (Brodzinsky, 2011). Future research should include this new, emerging

demographic. Finally, 66% of the adolescents in the sample were from international adoptions that were predominantly Korean. Consequently, study results might not be generalizable to adoptees from other countries. Since the SIBS intake sample was initially collected in 1998, intercountry adoptions (ICA) have included various countries such as China, Russia, Guatemala and Ethiopia (Selman, 2009). For instance, adoptions from China peaked in 2005, and for Russia, in 2004 (Selman, 2009). Inclusion of other ICA countries of origin will allow future research to examine more within and between group variability. Given these adoption trends, future research should include adoptive families with more varied ethnic, racial, and sexual orientation backgrounds.

### **Concluding Remarks**

This study is just one incremental step toward developing a deeper understanding of explanatory family processes that contribute to adopted adolescent adjustment. Findings suggest that dyadic subsystems in families contributed to an overall process involving personality and family interactions that explained variance in adopted adolescent externalizing behavior. Findings also underscore the complexity of adoptive family processes that contributed to adopted adolescent adjustment. Previous descriptive research supporting a direct association between externalizing and adoption status is clearly oversimplified.

Future work should continue to uncover explanatory family processes that help explain the small but noteworthy risk for adopted adolescent externalizing behaviors. Findings from this study lay the foundation for future explanatory research to further investigate the impact of paradoxical family (a) situations (i.e., double bind) and (b)

interactions (i.e., conflict) on child adjustment. Moreover, research including the adoption kinship network (AKN; Grotevant, 2000) in family processes should be incorporated into future efforts.

Until more explanatory processes are unveiled and replicated, future research should also explore the therapeutic ramifications of how mental health professionals working with adopted adolescents and families respond to the issues of dyadic trait fit (DTF), double binds, and parent-adolescent conflict in a clinical context. Adoption status adds a layer of complexity to our understanding of both explanatory family processes and therapeutic ramifications because of the established heritability in personality, communication, and externalizing behaviors. Hence, personality traits and cognitive processes associated with family communicative interactions will likely vary in adoptive families because children and parents do not share genetic relations. Much more is needed to understand how all of this affects child adjustment.

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Table 1

*Intercorrelations, Means, and Standard Deviations for all Study Variables*

Variable	1	2	3	4	5	6	7	8	9	10	11	M	SD
1. Aggression	--	<b>.01</b>	<b>.09</b>	<b>-.11</b>	<b>-.23</b>	<b>-.24</b>	<b>-.03</b>	<b>-.07</b>	<b>-.01</b>	<b>-.04</b>	<b>-.04</b>	<b>40.00</b>	<b>10.76</b>
2. Mother Alienation	.21	--	<b>.24</b>	<b>.02</b>	<b>.04</b>	<b>-.09</b>	<b>-.07</b>	<b>-.09</b>	<b>-.02</b>	<b>-.04</b>	<b>-.08</b>	<b>25.88</b>	<b>6.64</b>
3. Father Alienation	.12	.16	--	<b>-.06</b>	<b>-.001</b>	<b>-.06</b>	<b>-.13</b>	<b>-.07</b>	<b>-.10</b>	<b>-.08</b>	<b>-.17</b>	<b>27.86</b>	<b>7.26</b>
<i>Adolescent Conversation</i>													
4. Warmth	-.30	.01	.05	--	<b>.50</b>	<b>.31</b>	<b>.48</b>	<b>.22</b>	<b>.18</b>	<b>.45</b>	<b>.23</b>	<b>-.05</b>	<b>.71</b>
5. Listening responsiveness	-.22	.12	-.03	.47	--	<b>.44</b>	<b>.29</b>	<b>.31</b>	<b>.27</b>	<b>.24</b>	<b>.25</b>	<b>-.05</b>	<b>.82</b>
6. Communication	-.13	-.01	.01	.41	.50	--	<b>.11</b>	<b>.23</b>	<b>.24</b>	<b>.07</b>	<b>.15</b>	<b>-.04</b>	<b>1.05</b>
<i>Mother Conversation</i>													
7. Warmth	-.18	-.15	.01	.46	.22	.18	--	<b>.43</b>	<b>.37</b>	<b>.53</b>	<b>.33</b>	<b>.03</b>	<b>.81</b>
8. Listening Responsiveness	-.10	-.04	-.05	.24	.39	.25		--	<b>.52</b>	<b>.18</b>	<b>.43</b>	<b>-.04</b>	<b>.96</b>
9. Communication	-.12	-.10	-.04	.15	.26	.32	.38	.46	--	<b>.12</b>	<b>.26</b>	<b>.01</b>	<b>1.07</b>
<i>Father Conversation</i>													
10. Warmth	-.17	-.04	-.06	.37	.23	.17	.38	.29	.21	--	<b>.46</b>	<b>.02</b>	<b>.69</b>

Table 1 (continued)	1	2	3	4	5	6	7	8	9	10	11	M	SD
11. Listening Responsiveness	-.12	.002	-.06	.22	.35	.19	.16	.34	.18	.49	--	<b>.02</b>	<b>.80</b>
12. Communication	-.09	-.06	-.16	.09	.15	.34	.06	.22	.28	.33	.42	<b>-.01</b>	<b>1.05</b>
Adolescent conflict													
Adolescent to mother													
13. Angry coercion	.05	.03	-.01	-.08	-.07	-.17	.03	.02	-.12	-.01	-.05	<b>1.77</b>	<b>1.29</b>
14. Hostility	.03	.05	.01	-.08	-.08	-.16	.07	.02	-.07	<.001	-.07	<b>2.24</b>	<b>1.57</b>
Adolescent to father													
15. Angry Coercion	-.05	.08	.01	.02	-.04	-.12	.20	.11	.04	.06	-.03	<b>1.59</b>	<b>.97</b>
16. Hostility	-.07	.04	.03	.04	-.06	-.14	.23	.09	.02	.06	-.09	<b>2.03</b>	<b>1.40</b>
Adolescent Externalizing													
17. Symptoms	.34	.21	.03	-.09	-.17	-.06	-.05	.05	.003	-.03	-.01	<b>5.87</b>	<b>6.12</b>
18. Teachers	.37	.26	.05	-.18	-.15	-.11	-.06	.07	.04	-.11	-.06	<b>66.25</b>	<b>17.95</b>
19. Self-report	.48	.32	-.002	-.18	-.14	-.06	-.04	-.04	-.07	-.13	-.06	<b>43.18</b>	<b>7.40</b>
Control variables													
20. Age	<.001	.02	.14	.01	-.02	.13	.09	-.02	.03	-.05	-.03	<b>16.00</b>	<b>1.49</b>
21. Gender	-.41	-.02	.05	.15	.18	.17	-.02	.04	.05	-.05	-.05	<b>1.50</b>	<b>.50</b>
M	38.51	26.01	27.90	.08	.08	.06	-.04	-.07	-.01	-.03	-.03		
SD	10.26	7.00	7.64	.77	.81	1.02	.82	.90	1.08	.59	.79		

Table 1 (continued)													
	12	13	14	15	16	17	18	19	20	21		M	SD
1. Aggression	<b>-.16</b>	<b>.20</b>	<b>.27</b>	<b>.18</b>	<b>.23</b>	<b>.37</b>	<b>.32</b>	<b>.45</b>	<b>-.09</b>	<b>-.39</b>		--	--
2. Mother Alienation	<b>-.15</b>	<b>.11</b>	<b>.10</b>	<b>-.002</b>	<b>-.03</b>	<b>.08</b>	<b>.15</b>	<b>.01</b>	<b>.001</b>	<b>-.001</b>		--	--
3. Father Alienation	<b>-.22</b>	<b>.01</b>	<b>.04</b>	<b>.04</b>	<b>.04</b>	<b>.06</b>	<b>.04</b>	<b>-.02</b>	<b>.07</b>	<b>-.07</b>		--	--
<i>Adolescent Conversation</i>													
4. Warmth	<b>.09</b>	<b>-.14</b>	<b>-.16</b>	<b>-.17</b>	<b>-.18</b>	<b>-.13</b>	<b>-.14</b>	<b>-.14</b>	<b>-.05</b>	<b>.17</b>		--	--
5. Listening responsiveness	<b>.15</b>	<b>-.14</b>	<b>-.22</b>	<b>-.19</b>	<b>-.21</b>	<b>-.18</b>	<b>-.15</b>	<b>-.15</b>	<b>-.01</b>	<b>.18</b>		--	--
6. Communication	<b>.17</b>	<b>-.13</b>	<b>-.19</b>	<b>-.13</b>	<b>-.16</b>	<b>-.15</b>	<b>-.08</b>	<b>-.06</b>	<b>.10</b>	<b>.17</b>		--	--
<i>Mother Conversation</i>													
7. Warmth	<b>.18</b>	<b>.02</b>	<b>.03</b>	<b>-.12</b>	<b>-.09</b>	<b>-.13</b>	<b>-.08</b>	<b>-.06</b>	<b>-.10</b>	<b>.03</b>		--	--
8. Listening Responsiveness	<b>.20</b>	<b>-.03</b>	<b>-.02</b>	<b>-.07</b>	<b>-.08</b>	<b>-.09</b>	<b>-.13</b>	<b>-.09</b>	<b>-.04</b>	<b>.11</b>		--	--
9. Communication	<b>.24</b>	<b>.04</b>	<b>.02</b>	<b>-.16</b>	<b>-.10</b>	<b>-.10</b>	<b>-.12</b>	<b>-.02</b>	<b>-.07</b>	<b>.05</b>		--	--
<i>Father Conversation</i>													
10. Warmth	<b>.36</b>	<b>-.07</b>	<b>-.08</b>	<b>-.06</b>	<b>-.08</b>	<b>-.05</b>	<b>-.09</b>	<b>-.002</b>	<b>-.12</b>	<b>.04</b>		--	--
11. Listening Responsiveness	<b>.49</b>	<b>-.05</b>	<b>-.06</b>	<b>-.02</b>	<b>-.08</b>	<b>-.01</b>	<b>-.03</b>	<b>.03</b>	<b>-.12</b>	<b>.07</b>		--	--
12. Communication	--	<b>-.14</b>	<b>-.15</b>	<b>-.02</b>	<b>-.04</b>	<b>-.14</b>	<b>-.05</b>	<b>-.04</b>	<b>-.15</b>	<b>.02</b>		--	--

Table 1 (continued)	12	13	14	15	16	17	18	19	20	21		M	SD
Adolescent conflict													
Adolescent to mother													
13. Angry coercion	-.11	--	<b>.86</b>	<b>.54</b>	<b>.51</b>	<b>.20</b>	<b>.16</b>	<b>.31</b>	<b>.03</b>	<b>-.09</b>		--	--
14. Hostility	-.08	.82	--	<b>.55</b>	<b>.62</b>	<b>.27</b>	<b>.20</b>	<b>.36</b>	<b>.02</b>	<b>-.11</b>		--	--
Adolescent to father													
15. Angry Coercion	-.03	.50	.52	--	<b>.85</b>	<b>.20</b>	<b>.15</b>	<b>.25</b>	<b>.13</b>	<b>-.11</b>		--	--
16. Hostility	-.03	.45	.66	.83	--	<b>.24</b>	<b>.17</b>	<b>.27</b>	<b>.12</b>	<b>-.14</b>		--	--
Adolescent Externalizing													
17. Symptoms	-.02	.05	.05	.03	.03	--	<b>.54</b>	<b>.42</b>	<b>.04</b>	<b>-.27</b>		--	--
18. Teachers	-.05	.12	.07	.12	.05	.44	--	<b>.30</b>	<b>.02</b>	<b>-.31</b>		--	--
19. Self-report	-.04	.17	.13	.16	.09	.55	.54	--	<b>.15</b>	<b>-.27</b>		--	--
Control variables													
20. Age	-.03	.17	.11	.19	.09	.24	.21	.26	--	<b>.17</b>		--	--
21. Gender	-.003	-.01	.02	.04	.10	-.18	-.23	-.27	.08	--		--	--
M	<b>.02</b>	<b>1.54</b>	<b>1.91</b>	<b>1.38</b>	<b>1.70</b>	<b>3.67</b>	<b>61.92</b>	<b>43.42</b>	<b>16.37</b>	<b>1.53</b>			
SD	<b>1.03</b>	<b>.97</b>	<b>1.31</b>	<b>.85</b>	<b>1.15</b>	<b>4.74</b>	<b>13.66</b>	<b>9.14</b>	<b>1.48</b>	<b>.50</b>			

*Note.* Intercorrelations for adopted adolescent participants ( $n = 384$ ) are presented above the diagonal (in bold), and intercorrelations for non-adopted adolescent participants ( $n = 231$ ) are presented below the diagonal (not in bold). Means and standard deviations for adopted adolescents are presented in the vertical columns (in bold), and means and standard deviations for the non-adopted adolescents are presented in the horizontal rows (not in bold).

Table 2

*Summary of Model Fit Statistics for all Mother (Father)-Adolescent Models*

Model	<i>df</i>	Model Fit Statistics				
		$\chi^2$	CFI	TLI	RMSEA	SRMR
RQ1						
Conceptual process	74 (74)	108.60** (110.71**)	.99 (.99)	.98 (.98)	.03 (.03)	.03 (.03)
RQ2						
Base (or control)	110 (110)	204.34*** (202.98***)	.97 (.97)	.96 (.96)	.04 (.04)	.04 (.04)
Actor (or main) effects	94 (94)	140.29*** (155.95***)	.99 (.98)	.98 (.97)	.03 (.03)	.03 (.04)
RQ3						
Partner effects	92 (92)	134.28*** (150.45***)	.99 (.98)	.98 (.97)	.03 (.03)	.03 (.03)
RQ4						
DTF interaction 1 Alienation X Aggression	104 (104)	154.39*** (176.90***)	.99 (.98)	.98 (.97)	.03 (.03)	.03 (.03)
DTF interaction 2 Aggression X Alienation	106 (106)	162.19*** (179.01)	.98 (.98)	.98 (.97)	.03 (.03)	.03 (.03)
RQ5						
Adoption status (AS) main	117 (117)	202.97*** (217.51***)	.97 (.97)	.96 (.96)	.04 (.04)	.03 (.03)
AS interaction 1	132 (132)	236.47*** (250.34***)	.97 (.96)	.96 (.95)	.04 (.04)	.03 (.04)

Table 2 (continued)

Aggression X AS

AS interaction 2	134 (134)	226.01*** (	.97 (.97)	.96 (.96)	.04 (.03)	.03 (.03)
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Alienation X AS

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*Note.* N = 615. DTF = Dyadic Trait Fit; AS = Adoption Status; *df* = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual. \**p* < .05 \*\**p* < .01 \*\*\**p* < .001.



Table 3

Summary of Explained Variance ( $R^2$ ) in all Mother (Father)-Adolescent Models

Model	Family Communication				Adolescent Conflict		Adolescent Externalizing	
	Adolescent Conversation		Mother (Father) Conversation		$R^2$	$\Delta R^2$	$R^2$	$\Delta R^2$
	$R^2$	$\Delta R^2$	$R^2$	$\Delta R^2$				
<i>RQ1</i>								
Conceptual	.07*** (.07**)	-- (--)	.02 (.04*)	-- (--)	.13*** (.10***)	-- (--)	.45*** (.43***)	-- (--)
<i>RQ2</i>								
Base (or control)	.07** (.08***)	-- (--)	-- (--)	-- (--)	.04* (.04*)	-- (--)	.24*** (.24***)	-- (--)
Actor (main) effects	.09*** (.10***)	.02** (.02**)	.02 (.04*)	-- (.04**)	.14*** (.10***)	.10** (.06**)	.53*** (.52***)	.29** (.28**)
<i>RQ3</i>								
Partner effects	.12*** (.12***)	.03* (.02)	.02 (.05*)	-- (.01)	.13*** (.10***)	-- (--)	.53*** (.52***)	-- (--)
DTF Interaction 1	.12***	--	.02	--	.14***	.01	.55***	.02

<u>Table 3 (continued)</u>	(.12***)	(--)	(.05*)	(--)	(.11***)	(.01**)	(.54***)	(.02**)
DTF Interaction 2	.11***	--	.02	--	.13***	--	.55***	.02*
	(.12***)	(--)	(.05*)	(--)	(.11***)	(.01*)	(.54***)	(.02*)
<hr/>								
<i>RQ4</i>								
AS (main effects)	.12***	--	.03	--	.15***	.02**	.54***	.01**
	(.13***)	.01**	(.05*)	(.01**)	(.12***)	(.02**)	(.52***)	(--)
AS Interaction 1	.12***	--	.03	--	.17***	.02**	.54***	--
	(.13***)	(--)	(.05*)	(--)	(.15***)	(.03**)	(.52***)	(--)
AS Interaction 2	.12***	--	.03	--	.15***	--	.54***	--
	(.13***)	(--)	(.05*)	(--)	(.12***)	(--)	(.52***)	(--)

*Note.* N = 615. DTF = Dyadic Trait Fit; AS = Adoption Status; DTF Interaction 1 = Parent alienation X Adolescent aggression; DTF Interaction 2 = Adolescent aggression X Parent alienation; AS Interaction 1 = Adoption status X Adolescent aggression; AS Interaction 2 = Adoption status X Parent alienation \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ .

Table 4

*RQ1 Standardized Coefficients ( $\beta$ ) for all Mother (Father)-Adolescent Conceptual Process Models*

Predictors	Dependent Variables (Regressed on predictors)			
	Adolescent <i>Conversation</i>	Parent <i>Conversation</i>	Adolescent Conflict	Adolescent Externalizing
	Coefficient ( $\beta$ )			
Adolescent				
Aggression	-.27*** (-.27***)	-- (--)	.10* (.13**)	.53*** (.54***)
<i>Conversation</i>	-- (--)	-- (--)	-.35*** (-.25***)	-- (--)
Conflict	-- (--)	-- (--)	-- (--)	.26*** (.28**)
Parent				
Alienation	-- (--)	-.13** (-.19***)	.10* (.02)	.15*** (-.03)
<i>Conversation</i>	-- (--)	-- (--)	.19** (.02)	-- (--)

Note. N = 615. \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ .

Table 5

*RQ2 Standardized Coefficients ( $\beta$ ) for all Mother (Father)-Adolescent Base (or Control) Models*

	Dependent Variables (Regressed on predictors)			
	Adolescent Aggression	Adolescent <i>Conversation</i>	Adolescent Conflict	Adolescent Externalizing
Predictors	Coefficient ( $\beta$ )			
Adolescent age	-.002(-.01)	.003(.03)	.11*(.11*)	.27***(.27***)
Adolescent gender	-.40***(-.39***)	.23***(.24***)	-.10*(-.10*)	-.43***(-.43***)
Adoption status	-.06(-.06)	.12**(.11*)	-.14**(-.15***)	-.15***(-.15***)

*Note.* N = 615. Gender: 1 = male, 2 = female; adoption status: 1 = adopted, 2 = non-adopted. \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ .

Table 6.

*RQ2 Standardized Coefficients ( $\beta$ ) for all Mother (Father)-Adolescent Actor (or Main Effect) Models*

	Dependent Variables (Regressed on predictors)				
	Adolescent Aggression	Adolescent <i>Conversation</i>	Parent <i>Conversation</i>	Adolescent Conflict	Adolescent Externalizing
Predictors	Coefficient ( $\beta$ )				
Adolescent					
Age	-.01(.02)	.02(.04)	--(--)	.08(.09*)	.24***(.25***)
Gender	-.39***(-.39***)	.15***(.16***)	--(--)	.03(.02)	-.22***(-.21***)
Aggression	--(--)	-.21***(-.20***)	--(--)	.12**(.14**)	.45***(.47***)
<i>Conversation</i>	--(--)	--(--)	--(--)	-.35***(-.26***)	-.05(-.07)
Conflict	--(--)	--(--)	--(--)	--(--)	.22***(-.24***)
Parent					
Alienation	--(--)	--(--)	-.13***(-.19***)	.10*(.01)	.16***(-.05)
<i>Conversation</i>	--(--)	--(--)	--(--)	.20***(.03)	-.01(.07)

Note. N = 615. Gender: 1 = male, 2 = female. \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ .

Table 7.

*RQ3 Standardized Coefficients ( $\beta$ ) for all Mother (Father)-Adolescent Partner Effect Models*

Predictors	Dependent Variables (Regressed on predictors)				
	Adolescent Aggression	Adolescent <i>Conversation</i>	Parent <i>Conversation</i>	Adolescent Conflict	Adolescent Externalizing
	Coefficient ( $\beta$ )				
<b>Adolescent</b>					
Age	-.01(-.02)	.01(.04)	--(--)	.08(.09*)	.24***(.25***)
Gender	-.39***(-.39***)	.14**(.16***)	--(--)	.03(.02)	-.22***(-.21***)
Aggression	--(--)	-.25***(-.24***)	-.09*(-.11*)	.12**(.14**)	.45***(.48***)
<i>Conversation</i>	--(--)	--(--)	--(--)	-.35***(-.26***)	-.05(-.07)
Conflict	--(--)	--(--)		--(--)	.22***(.24***)
<b>Parent</b>					
Alienation	--(--)	.07(-.004)	-.09*(-.18***)	.11*(.01)	.16***(-.05)
<i>Conversation</i>	--(--)	--(--)	--(--)	.20***(.03)	-.01(.07)

Note. N = 615. Gender: 1 = male, 2 = female. \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ .

Table 8.

*Summary of all Indirect Effects for all Mother (Father)-Adolescent Models*

Model	Indirect effect					
	Conflict → Adolescent <i>Conversation</i> → Aggression	Externalizing → Conflict → Alienation	Externalizing → Conflict → Parent <i>Conversation</i>	Externalizing → Conflict → Adolescent <i>Conversation</i>	Externalizing → Conflict → Adolescent <i>Conversation</i> → Aggression	Externalizing → Conflict → Aggression
	Coefficient					
	$\beta$					
Partner effects	.09***(.06**)	--(--)	.05**(--)	-.08***(-.06**)	.02**(.02**)	.03*(.03*)
DTF Interaction 1	.09***(.06***)	.02*(--)	.05**(--)	-.08***(-.06***)	.002**(.02**)	.03*(.03**)
DTF Interaction 2	.09***(.06***)	.02*(--)	.04**(--)	-.08***(-.06***)	.02**(.02**)	.03*(.03**)
AS main effects	.09***(.06**)	.02*(--)	.04**(--)	-.08***(-.06**)	.02**(.01**)	.03*(.03*)
AS Interaction 1	.09***(.06**)	.03*(--)	.05*(--)	-.08***(-.06**)	.02**(.01**)	.03*(.03*)
AS Interaction 2	.09***(.06**)	.02*(--)	.04**(--)	-.08***(-.06**)	.02**(.01**)	.03*(.03*)

*Note.* N = 615. DTF = Dyadic Trait Fit; AS = adoption status. Father-adolescent indirect effects not reported in table: AS main effects, AS Interaction 1 & 2 models: Externalizing → Conflict → Adoption status (-.03\*). \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ .

Table 9.

*RQ4 Standardized Coefficients ( $\beta$ ) for all Mother (Father)-Adolescent Dyadic Trait Fit (DTF) Interaction Models*

Predictors	Dependent Variables (Regressed on predictors)				
	Adolescent Aggression	Adolescent <i>Conversation</i>	Parent <i>Conversation</i>	Adolescent Conflict	Adolescent Externalizing
	Coefficient ( $\beta$ )				
DTF Interaction 1					
Adolescent					
Age	-.01(-.01)	.01(.04)	--(--)	.08(.09*)	.24***(.25***)
Gender	-.40***(-.39***)	.14**(.16***)	--(--)	.03(.02)	-.21***(-.20***)
Aggression	--(--)	-.25***(-.24***)	-.09*(-.11*)	.12**(.14***)	.45***(.47***)
<i>Conversation</i>	--(--)	--(--)	--(--)	-.36***(-.26***)	-.04(-.06)
Conflict	--(--)	--(--)	--(--)	--(--)	.22***(.24***)
Parent					
Alienation	--(--)	.08(-.002)	-.09*(-.18***)	.11**(.01)	.15***(-.05)
<i>Conversation</i>	--(--)	--(--)	--(--)	.21***(.03)	-.02(.06)
DTF Interaction 2					
Adolescent					



Table 9 (continued)

Age	-.01(-.01)	.01(.04)	--(--)	.08(.09*)	.23***(.25***)
Gender	-.40***(-.39***)	.14***(.16***)	--(--)	.03(.02)	-.21***(-.20***)
Aggression	--(--)	-.25***(-.24***)	-.10*(-.11*)	.12**(.14**)	.45***(.47***)
<i>Conversation</i>	--(--)	--(--)	--(--)	-.35***(-.26***)	-.06(-.06)
Conflict	--(--)	--(--)	--(--)	--(--)	.22***(.24***)
Parent					
Alienation	--(--)	.07(-.002)	-.10*(-.18***)	.11*(.01)	.16***(-.05)
<i>Conversation</i>	--(--)	--(--)	--(--)	.20***(.03)	-.01(.06)

*Note.* N = 615. DTF Interaction 1 = parent alienation X adolescent aggression; DTF Interaction 1 = adolescent aggression X parent alienation; gender: 1 = male, 2 = female. \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ .

Table 10.

*RQ5 Standardized Coefficients ( $\beta$ ) for all Mother (Father)-Adolescent Adoption Status (Main effect) Models*

Predictors	Dependent Variables (Regressed on predictors)				
	Adolescent Aggression	Adolescent <i>Conversation</i>	Parent <i>Conversation</i>	Adolescent Conflict	Adolescent Externalizing
	Coefficient ( $\beta$ )				
<b>Adolescent</b>					
Adoption status	-.06(-.06)	.08(.09*)	--(--)	-.09(-.11**)	-.09*(.08)
Age	-.003(-.01)	.08(.03)	--(--)	.10*(.11*)	.24***(.25***)
Gender	-.39***(-.39***)	.14***(.16***)	--(--)	.03(.02)	-.22***(-.21***)
Aggression	--(--)	-.25***(-.23***)	-.10*(-.11*)	.12**(.14**)	.45***(.47***)
<i>Conversation</i>	--(--)	--(--)	--(--)	-.35***(-.25***)	-.04(-.06)
Conflict	--(--)	--(--)	--(--)	--(--)	.22***(.23***)
<b>Parent</b>					
Adoption status	--(--)	--(--)	-.09*(-.02)	--(--)	--(--)
Alienation	--(--)	.07(-.003)	-.09*(-.18***)	.10*(.01)	.16***(-.05)
<i>Conversation</i>	--(--)	--(--)	--(--)	.19**(.02)	-.02(.06)

*Note.* N = 615. Gender: 1 = male, 2 = female; adoption status: 1 = adopted, 2 = non-adopted. \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ .

Table 11.

*RQ5 Standardized Coefficients ( $\beta$ ) for all Mother (Father)-Adolescent Adoption Status (interaction effect) Models*

Predictors	Dependent Variables (Regressed on predictors)				
	Adolescent Aggression	Adolescent <i>Conversation</i>	Parent <i>Conversation</i>	Adolescent Conflict	Adolescent Externalizing
	Coefficient ( $\beta$ )				
AS Interaction 1					
Adolescent					
Adoption status	-.06(-.06)	-.01(.09*)	--(--)	-.10*(-.12**)	-.09*(-.08)
AS X aggression	--(--)	-.01(-.01)	--(--)	-.15***(-.15***)	--(--)
Age	>.001(-.01)	.003(.03)	--(--)	.11*(.12**)	.24***(.25***)
Gender	-.39***(-.39***)	.14***(.16***)	--(--)	.02(.01)	-.22***(-.21***)
Aggression	--(--)	-.25***(-.23***)	-.10*(-.11*)	.11*(.12*)	.45***(.47***)
<i>Conversation</i>	--(--)	--(--)	--(--)	-.35***(-.25***)	-.04(-.06)
Conflict		--(--)	--(--)	--(--)	.22***(.23***)
Parent					
Adoption status	--(--)	--(--)	-.09*(-.02)	--(--)	--(--)
Alienation	--(--)	.07	-.09*(-.18***)	.12**(.01)	.16***(-.05)

Table 11 (continued)

<i>Conversation</i>	--(--)	--(--)	--(--)	.19**(-.02)	-0.02(.06)
AS Interaction 2					
Adolescent					
Adoption status	-.06(-.06)	.08(.09*)	--(--)	-.09(-.11*)	-.09*(-.08)
Age	-.003(-.01)	.003(.03)	--(--)	.10*(.11*)	.24***(.25***)
Gender	-.39***(-.39***)	.14***(.16***)	--(--)	.03(.02)	-.22***(-.21***)
Aggression	--(--)	-.25***(-.23***)	-.10*(-.11*)	.12**(.14**)	.45***(.47***)
<i>Conversation</i>	--(--)	--(--)	--(--)	-.35***(-.25***)	-.04(-.06)
Conflict	--(--)	--(--)	--(--)	--(--)	.22***(.23***)
Parent					
AS X alienation	--(--)	--(--)	-.001(.03)	--(--)	--(--)
Alienation	--(--)	.07(-.003)	-.09*(-.18***)	.10*(.01)	.16***(-.05)
<i>Conversation</i>	--(--)	--(--)	--(--)	.19**(.02)	.02(.06)

Note. N = 615. AS = adoption status (1= adopted, 2 = non-adopted); AS interaction 1 = adoption status X adolescent aggression; AS interaction 2 = adoption status X parent alienation; gender: 1 = male, 2 = female. \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ .

Table 12.

*Summary of Factor Loadings ( $\lambda$ ) for all Mother (Father)-Adolescent Models*

	Family Communication												
	Adolescent <i>Conversation</i>			Parent <i>Conversation</i>			Adolescent Conflict				Adolescent Externalizing		
	WM	LR	CO	WM	LR	CO	HSAM	HSAF	ACAM	ACAF	DICA-R	TR	DBI
Model													
RQ1													
Conceptual process	.61	.80	.59	.60	.77	.64	.89	.71	.76	.70	.67	.62	.69
	(.61)	(.78)	(.60)	(.60)	(.77)	(.61)	(.85)	(.74)	(.73)	(.73)	(.67)	(.61)	(.69)
RQ2													
Base (or control)	.61	.79	.59	.60	.78	.64	.86	.74	.74	.72	.66	.61	.70
	(.61)	(.78)	(.60)	(.60)	(.78)	(.59)	(.83)	(.77)	(.71)	(.76)	(.66)	(.61)	(.71)
Actor (or main) effects	.61	.79	.59	.61	.77	.64	.90	.70	.77	.69	.64	.61	.72
	(.61)	(.77)	(.60)	(.60)	(.77)	(.60)	(.86)	(.74)	(.74)	(.72)	(.64)	(.60)	(.73)
RQ3													
Partner effects	.61	.80	.59	.61	.77	.64	.90	.70	.77	.69	.64	.61	.72
	(.62)	(.77)	(.61)	(.60)	(.76)	(.61)	(.86)	(.74)	(.74)	(.72)	(.64)	(.60)	(.73)
RQ4													

Table 12 (continued)

DTF Interaction 1	.61 (.62)	.80 (.77)	.59 (.61)	.61 (.60)	.77 (.76)	.64 (.61)	.91 (.86)	.70 (.74)	.77 (.74)	.70 (.72)	.65 (.64)	.62 (.60)	.73 (.74)
DTF Interaction 2	.61 (.61)	.80 (.77)	.59 (.61)	.61 (.60)	.77 (.76)	.64 (.61)	.90 (.86)	.70 (.74)	.77 (.74)	.69 (.72)	.65 (.64)	.62 (.60)	.73 (.73)
<hr/>													
RQ5													
AS (main effects)	.61 (.62)	.80 (.77)	.59 (.61)	.61 (.60)	.77 (.76)	.63 (.61)	.88 (.84)	.72 (.76)	.76 (.73)	.71 (.74)	.66 (.66)	.62 (.61)	.70 (.71)
AS Interaction 1	.62 (.62)	.79 (.77)	.59 (.61)	.61 (.60)	.77 (.76)	.63 (.61)	.86 (.83)	.74 (.77)	.74 (.71)	.72 (.75)	.66 (.66)	.62 (.61)	.70 (.71)
AS Interaction 2	.61 (.62)	.80 (.77)	.59 (.61)	.61 (.60)	.77 (.76)	.63 (.61)	.88 (.84)	.72 (.76)	.76 (.73)	.71 (.74)	.66 (.65)	.62 (.61)	.70 (.71)

*Note.* N = 615. A = adolescent; M = mother; F = father; DTF = Dyadic Trait Fit; AS = Adoption status (1 = adopted, 2 = non-adopted); WM = Warmth; LR = Listening Responsiveness; CO = Communication; HS = Hostility; AC = Angry/Coercion; DICA-R = Diagnostic Interview for Children and Adolescents, Revised; TR = Teacher Report; DBI = Delinquent Behavior Inventory; DTF Interaction 1 = parent alienation X adolescent aggression; DTF Interaction 2 = adolescent aggression X parent alienation; AS interaction 1 = adoption status X adolescent aggression; AS interaction 2 = adoption status X parent alienation. \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ .

Figure 1. *Conceptual process model (RQ1).*

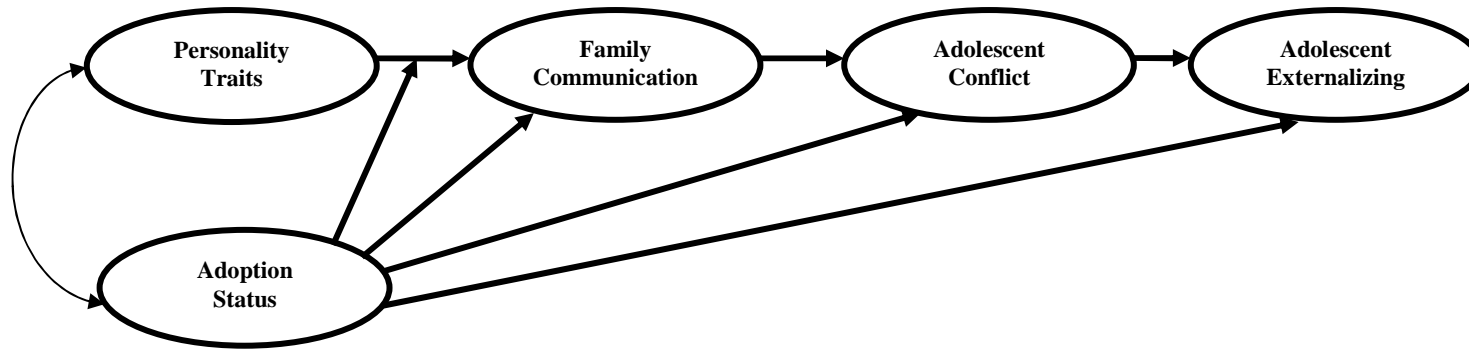
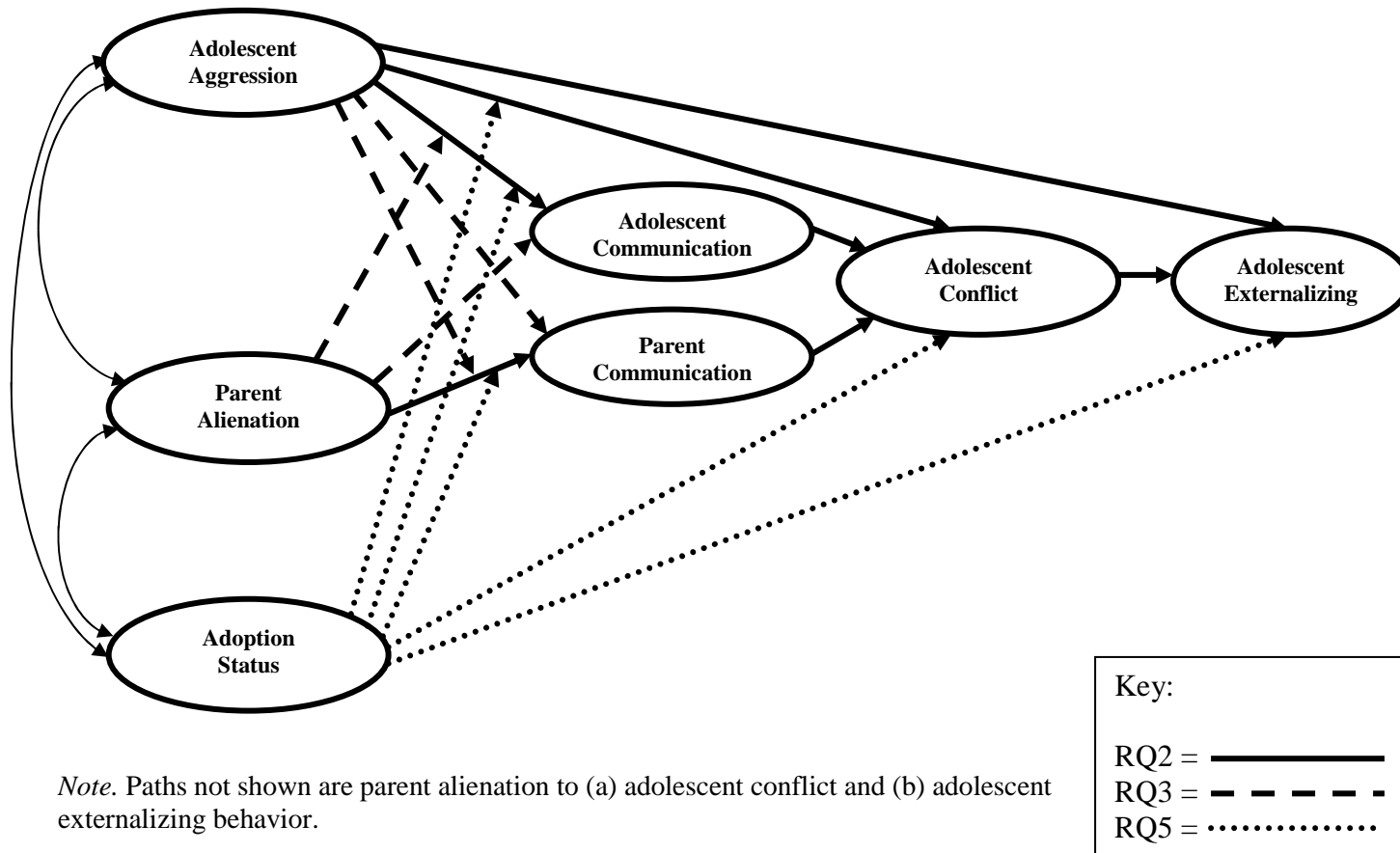


Figure 2. Family Process Model.



Note. Paths not shown are parent alienation to (a) adolescent conflict and (b) adolescent externalizing behavior.



Figure 3. Dyadic Trait Fit (DTF) Interaction Model 1 (Mother-Adolescent)

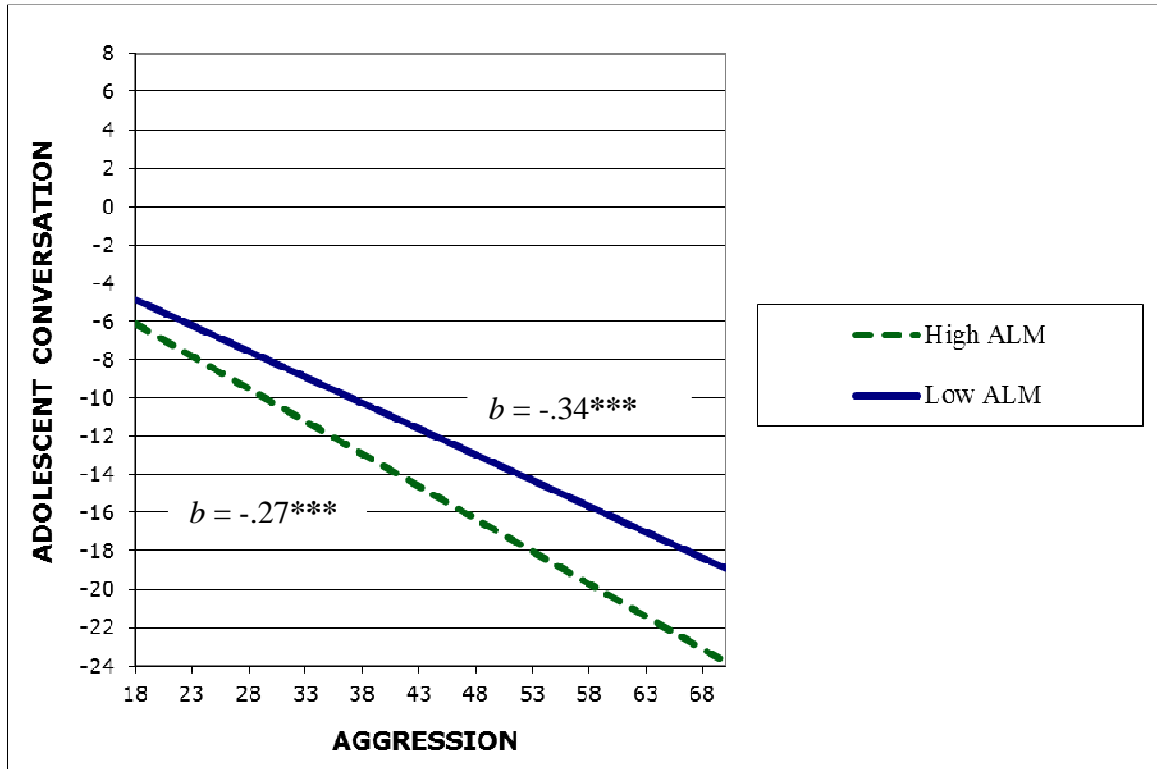
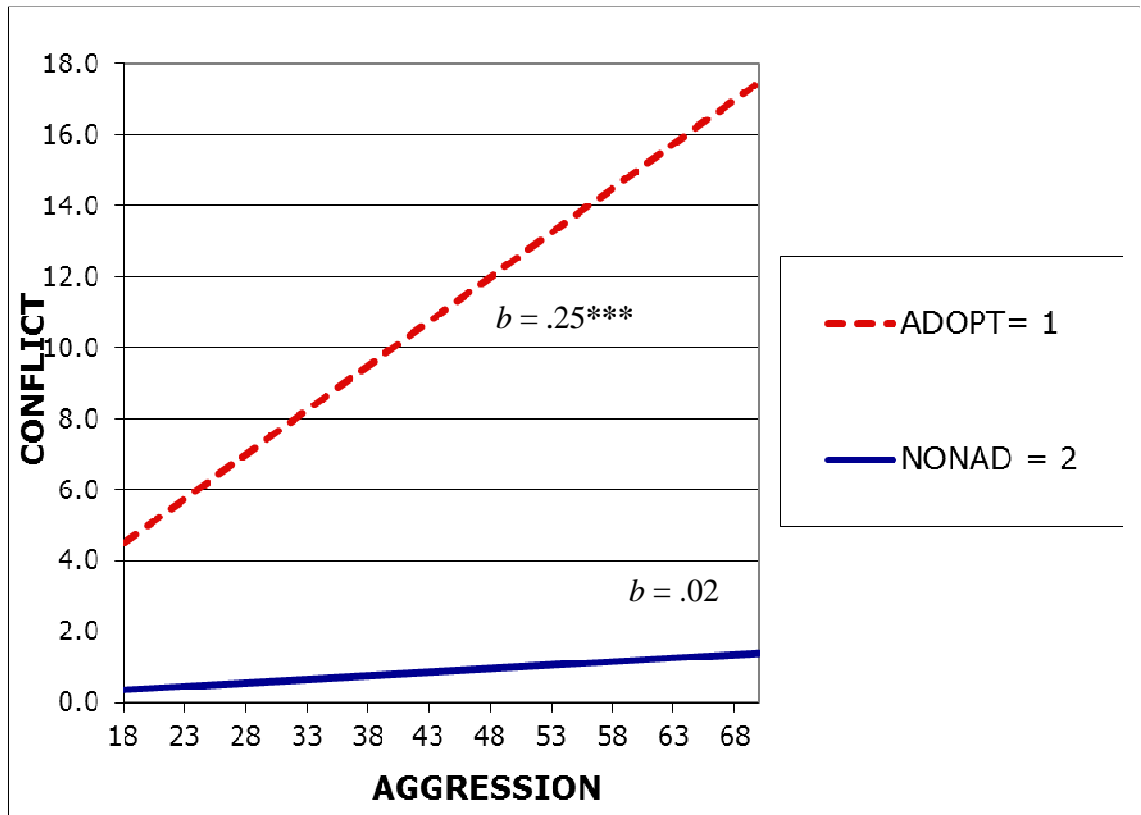


Figure 4. Adoption Status Interaction Model 1 for Parent-Adolescent Dyads



## Appendix A

### Dissertation Proposal

Personality Traits, Family Interactions, Adoption Status, and Adolescent Externalizing Behavior

#### PROJECT SUMMARY

Research has shown that adoptees are overrepresented in outpatient settings and are at greater risk (than non-adoptees) for externalizing behaviors. Yet there is a fundamental gap in our understanding of factors contributing to this poor adjustment. Explanations of this risk to adopted adolescents are needed to develop clinical interventions to address this significant health problem. The *long-term goal* of my overall program of research is to develop interventions to reduce adopted adolescent externalizing behaviors. The *objective of this application, which is my dissertation proposal*, is to take the next logical, needed step: to test an explanatory process model of contributing factors to adolescent adjustment with 616 families from the Sibling Interaction and Behavior Study. The *central hypothesis* for my dissertation research is that both adolescent and parent personality contribute to a process involving family communication, adolescent conflict, and adolescent externalizing behavior that differs in adoptive and non-adoptive families. The *rationale* for the proposed research is that its successful completion will be an important step toward understanding what contributes to adopted adolescent adjustment problems. The central hypothesis will be tested by accomplishing *three specific aims*: to determine (1) the extent to which a theorized process involving individual personality traits, observed family communication, and adolescent conflict is associated with adolescent externalizing behavior, (2) how one family member's personality influences another member's communication and contributes to the proposed process and, (3) the effects of adoption status on this process. This study's approach is *innovative* because it integrates traditional personality psychology and family studies. It also uses an adoption sample in a novel way: to test an explanatory process model of adjustment. The proposed research is *significant* because it is expected to advance our knowledge of adopted adolescent health outcomes. Results from this study can be used to inform clinical interventions to promote adopted adolescent health and well-being.

#### PROJECT NARRATIVE

The proposed research is *relevant to public health* because further understanding of contributing factors explaining the increased risk of adopted adolescents behavior problems will ultimately assist in clinical efforts to reduce them. The proposed study is *relevant to NIH's mission* because it pertains to developing knowledge that will contribute to healthy youth outcomes.

#### SPECIFIC AIMS

One and a half million (approximately 2%) United States children under the age of 18 are adopted. In the general population, behavior disorders are the second most prevalent (19.1%) presenting issue among youth ages 13 to 18 years. Research suggests that adopted children are more likely to experience adjustment problems than their non-adopted counterparts. In fact, adopted adolescents are at an increased risk for externalizing behaviors (e.g., disruptive behaviors, school problems, delinquency). Consequently, adopted adolescents may face developmental challenges that could impact their health and psychological adjustment. Research on adoptees, however, has focused on identifying and describing the risk rather than explaining processes that contribute to it. Few studies have sought to test conceptual models that explain this elevated risk to adopted adolescents. A better understanding of processes that contribute to adopted adolescent externalizing behavior would inform evidence-based clinical interventions to reduce them. Thus, there is a *critical need* to move beyond description to explanation to inform interventions and promote healthy adolescent adjustment.

My *long-term goal* is to develop clinical interventions aimed at reducing adopted adolescent externalizing behaviors. To achieve this goal, my overall program of research seeks to understand how personality, family interactions, and adoption status influence adolescent adjustment (see Figure 1, theoretical model). The next step toward my long-term goal, approached incrementally, is the *objective* of this dissertation proposal: to test an explanatory process model of contributing factors to adolescent adjustment with 616 families from the Sibling Interaction and Behavior Study (SIBS; McGue et al., 2007). My central hypothesis for this dissertation study is that adolescent aggression and parent alienation contribute to a process involving communication, adolescent conflict and adolescent externalizing behavior; this process differs in adoptive and non-adoptive families (see Figure 2). Conceptualized within a person-environment transactional framework, the Figure 2 model presupposes that genetic relatedness influences child development and family processes; it is also informed by goodness of fit and Family Communication Patterns (FCPT; Koerner & Fitzpatrick, 2002a, 2002b 2004, 2006) theories. The *rationale* for the proposed research is that its successful completion will be an important step toward understanding contributions to adopted adolescent adjustment problems. My quantitative research methods training, my ability to integrate theory and methods, and my clinical experience working with adopted adolescents and their families have all prepared me to pursue this research.

I plan to test my central hypothesis and achieve my stated objective by pursuing the following specific aims (see Figure 2):

**Aim 1: Determine the extent to which a theorized process involving adolescent aggression, parent alienation, adolescent and parent communication, and adolescent conflict is associated with adolescent externalizing (see Figure 2, “1” paths).**

H1.1: Personality traits are associated with adolescent communication, conflict and externalizing.

- H1.1a: Adolescent aggression is associated with adolescent communication, conflict and externalizing.
- H1.1b: Adolescent aggression is indirectly associated with adolescent externalizing through conflict (not shown in Figure 2).
- H1.1c: Parent alienation is associated with parent communication, adolescent conflict, and externalizing (not shown in Figure 2).
- H1.2: Adolescent and parent communication are associated with adolescent conflict and externalizing.
- H1.3: Adolescent conflict is associated with adolescent externalizing.

**Aim 2: Determine if adolescent and parent personality influence one another's communication within the aim 1 proposed process (see Figure 2, "2" paths).**

- H2.1 One family member's individual trait predicts another member's communication.

**Aim 3: Determine the effects of adoption status on components of the aim 1 proposed process (see Figure 2, "3" paths).**

- H3.1: Adoption status moderates the relationship between personality and communication, and personality and conflict.
  - H3.1a: Adoption status moderates the association between adolescent aggression and conflict.
  - H3.1b: Adoption status moderates the association between adolescent aggression and adolescent communication.
  - H3.1c: Adoption status moderates the association between parent alienation and parent communication.
- H3.2: Adoption status is associated with adolescent conflict and externalizing.
- H3.3: Adoption status is indirectly associated with adolescent externalizing through conflict (not shown in Figure 2).

Figure 1. Theoretical process model for overall program of research.

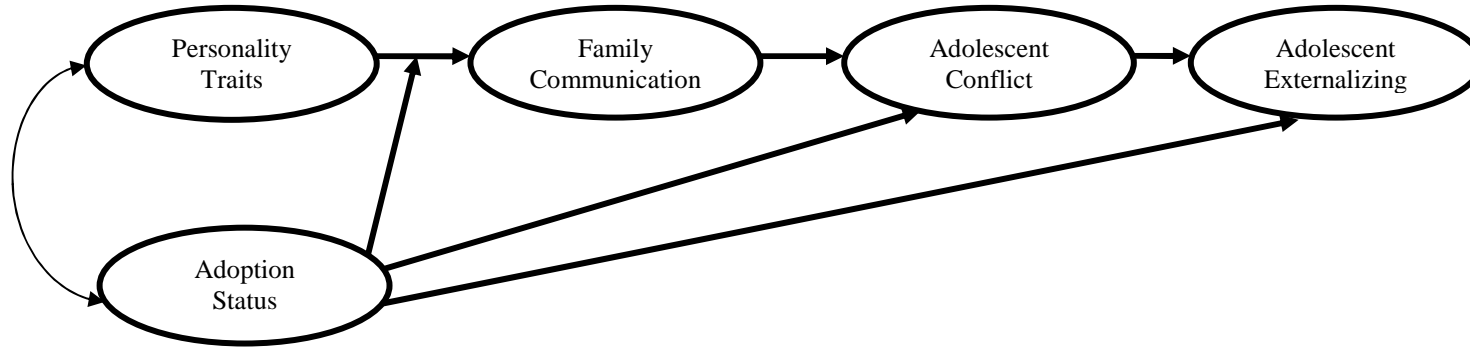
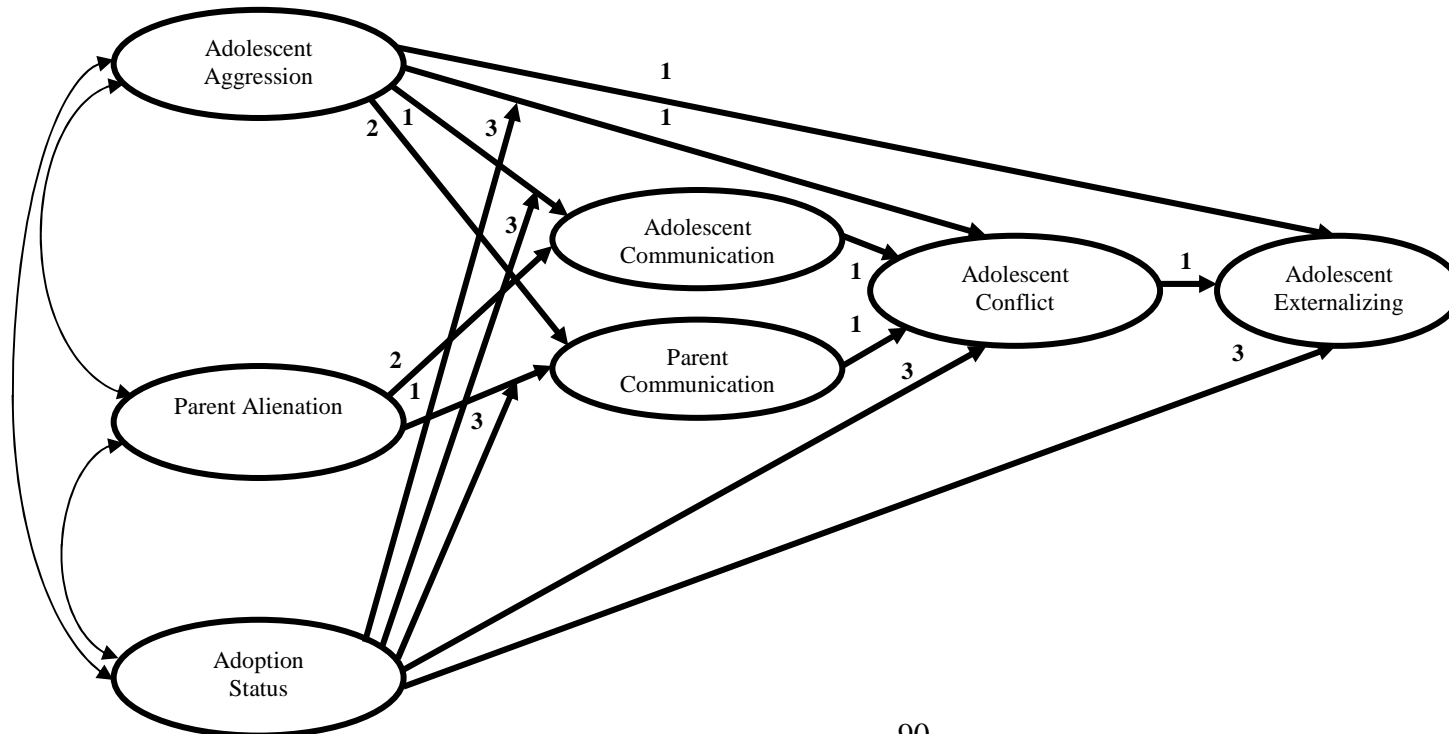


Figure 2. Proposed process model for dissertation research.



The *expected outcome* of these aims is to gain knowledge of adoptive families processes that contribute to poor adjustment. Achieving these aims will lay the foundation for future explanatory studies aimed at increasing our understanding of adoptive family processes that contribute to adjustment. The study's results are expected to have a *positive impact* because they will shed light on specific adoptive family processes that contribute to adopted adolescent externalizing behavior. This knowledge will be the starting point to build empirical research that can inform clinical interventions to promote healthy functioning.

## **SIGNIFICANCE**

The number of adopted children and the prevalence of negative child outcomes are two important factors that contribute to the significance of the proposed work. One and a half million (approximately 2%) United States children under the age of 18 are adopted. Additionally, nearly two-thirds of Americans report having (a) an adopted family member, (b) a close friend with an adopted family member, or (c) relinquished a child for adoption (Dave Thomas Foundation for Adoption with the Evan B. Donaldson Adoption Institute, 2002). Mental health outcomes are also crucial. Behavior disorders were the second most prevalent (19.1%) presenting issue among youth (13-18 years); nearly 10% reported severe behavior disorders (Merikangas et al., 2010). According to the National Institute of Mental Health (NIMH), approximately 40% of detained youth have a disruptive behavior or conduct disorder. Externalizing behaviors are clearly a significant health issue in the general population.

Research suggests that child personality (Eisenberg et al., 2000, 2009), the quality of family communication (Steinberg, 2001), and conflict (Eisenberg et al., 2008) contribute to adjustment outcomes in the general population. Goodness of fit (Lerner, 1993; Thomas & Chess, 1977) and person-environment transactional (Caspi et al., 1987, 1988; Sameroff, 1975; Scarr & McCartney, 1983) theories may explain how personality and parent-child interactions (e.g., communication, conflict) contribute to the process of shaping behavioral outcomes over time. Additionally, a two-level conceptualization of personality, based on dispositional traits and characteristic adaptations, may help us understand personality's association with communication and conflict, and how these associations contribute to adolescent externalizing behavior. Dispositional traits are expressed as characteristic adaptations in a given time, context, and/or social role (McAdams & Pals, 2006). Consistent with this conceptualization, it is reasonable to expect traits to manifest themselves in a family transactional environment (Caspi et al., 1987, 1988; Sameroff, 1975; Scarr & McCartney, 1983). For instance, individual traits may predict the type or quality of family interactions. Similarly, certain traits (e.g., aggression) may predict higher levels of conflict (Barber, 1994; Deković, 1999). Consistent with evocative gene-environment correlations and a transactional framework, parents may respond differently to children based on their personality traits (and vice versa). Moreover, the "fit" between individual traits and communicative interactions (e.g., communication, conflict) may determine child outcomes – a perspective consistent with goodness of fit theory (Lerner, 1993; Thomas & Chess, 1977). Taken together, these

theories support a theorized process in which personality contributes to both general (e.g., family communication) and specific (e.g., conflict) family interactions, and to adolescent outcomes.

Personality, communication, conflict, and externalizing behaviors all have some degree of heritability. Personality heritability estimates range from 40% to 80% (Krueger et al. 2008; Reimann et al., 1997). Underlying cognitive processes associated with communication, such as shared values, attitudes, and beliefs, also have a genetic foundation (Alford, Funk, & Hibbing, 2005; Olson, Vernon, Harris, & Jang, 2001; Tesser, 1993). These genetic effects (e.g., for attitudes) are not limited to adults and have been found in children as young as 12 years old (Abrahamson, Baker, & Caspi, 2002). Behavior genetics research also found a biological basis for (a) the association between parent-child conflict and externalizing outcomes (Burt, Krueger, McGue, & Iacono, 2003; Burt, McGue, Krueger, & Iacono, 2005), and (b) externalizing behaviors (Burt et al., 2007). Because all of the constructs in Figure 2 have a biological basis, it is important to understand the role of adoption status. An *adoption design*, which includes both adoptive and biological children, allows quantitative behavior genetics researchers to partial variance due to genetic (e.g., additive genetic effects) versus environmental (e.g., shared and non-shared effects) influences. Use of such a sample will also enable a comparison of the two types of families, and to determine if the Figure 2 process differs in adoptive compared with non-adoptive families.

Notably, little is known about how personality, communication, and conflict operate to influence adjustment in adoptive families. Existing descriptive studies (c.f. Juffer & van IJzendoorn, 2005; Keyes, Sharma, Elkins, Iacono, & McGue, 2008; Wierzbicki, 1993) fall short of providing explanations for this well-established risk. Descriptive behavior genetics studies do not test family processes that illuminate our understanding of how genetic relatedness might explain adjustment outcomes. Because personality is partially heritable (De Fruyt, Bartels, Van Leeuwen, De Clercq, Decuyper, & Mervielde, 2006; Johnson, McGue, & Krueger, 2005; Krueger, South, Johnson, & Iacono, 2008), adoptive children and parents are less likely to have similar personalities. Due to the role of heritability, we should understand how individual personality traits combined with general and specific family processes contribute to the risk of adopted adolescent externalizing behavior. To date, no such studies exist.

This study takes the next important step by testing family processes that may explain poor adjustment outcomes for adopted adolescents. Specifically, using a comparative sample (adoptive and non-adoptive), this work will enable us to better understand contributing personality and family factors to externalizing behaviors and will test a complex process that seeks to explain how adoption status contributes to adolescent externalizing behaviors (see Figure 2). When my specific aims are accomplished, my long-term goal will contribute to empirical research that will ultimately inform clinical interventions aimed at reducing externalizing behaviors. *This contribution will be significant because it takes the next necessary, incremental step in a long-term program of research that will inform evidence-based clinical interventions aimed at promoting*



*healthy adopted adolescent functioning.* Empirical research is needed to inform clinical interventions aimed at reducing externalizing behaviors and increasing positive health outcomes for adopted adolescents.

## **INNOVATION**

The work proposed in this application is innovative in two ways. First, it integrates two distinct fields – traditional personality psychology and family studies – to advance our knowledge of adopted adolescent adjustment. Family research has rarely drawn from personality psychology to explain factors contributing to the well-documented risk of adopted adolescent externalizing behavior. Recent explanatory models that attempt to explain the risk do not assess personality traits (e.g., Grotevant et al., in press; Rueter, Koh, Grotevant, & Wrobel, 2011). Furthermore, family research that has examined personality, communication, conflict, and adjustment has focused on understanding their associations in the general population (Eisenberg et al., 2000, 2009). Similarly, explanatory models in personality psychology have focused on identifying underlying biological substrates of the Big Five in the general population (DeYoung, 2010; DeYoung & Gray, 2009); they have not focused on understanding how individual traits contribute to a complex process that explains adoptees' adjustment.

Second, this study will use an adoption design for purposes other than its initial intention (upon collection by quantitative behavior genetics researchers): to test an explanatory family process that contributes to adjustment outcomes in adoptive and non-adoptive families. Previous research testing Figure 1 associations (e.g., personality and adjustment, conflict and adjustment) have used general population samples. Behavior genetics research utilizing adoption designs (e.g., SIBS; Nonshared Environment in Adolescent Development, NEAD) have yielded primary descriptive heritability statistics or have focused on early childhood development (e.g., Early Growth and Development Study, EGDS); they have not tested the theoretized process proposed in Figure 1. The few existing studies that have tested explanatory models (e.g., Grotevant et al., in press; Rueter, Koh, Grotevant, & Wrobel, 2011) have primarily used adoptive samples (e.g., Minnesota-Texas Research Project sample), precluding researchers from drawing comparisons. However, this study will use a comparative sample to assess the role of adoption status in the family process depicted in Figure 2. This proposed research goes beyond previous descriptive (a) behavior genetics and (b) adoption research by testing explanations of adjustment using an adoption design.

To adequately address the significant gap in our knowledge, the personality and family disciplines are uniquely integrated in a pioneering study that moves beyond previous descriptive research. In summary, *this proposed research is innovative because it uses an adoption design sample to (a) integrate personality psychology and family studies to advance our knowledge of adopted adolescent externalizing behavior and, (b) move beyond descriptive research in the adoption and behavior genetics fields.*

## **APPROACH**

**Aim 1: Determine the extent to which a theorized process involving adolescent aggression, parent alienation, adolescent and parent communication, and adolescent conflict is associated with adolescent externalizing (see Figure 2, “1” paths).**

H1.1: Personality traits are associated with adolescent communication, conflict and externalizing.

H1.1a: Adolescent aggression is associated with adolescent communication, conflict and externalizing.

H1.1b: Adolescent aggression is indirectly associated with adolescent externalizing through conflict (not shown in Figure 2).

H1.1c: Parent alienation is associated with parent communication, adolescent conflict, and externalizing (not shown in Figure 2).

H1.2: Adolescent and parent communication are associated with adolescent conflict and externalizing.

H1.3: Adolescent conflict is associated with adolescent externalizing.

***Aim 1: Introduction.*** The aim 1 *objective* is to determine the extent to which a theorized process involving personality traits, adolescent and parent communication, and adolescent conflict is associated with adolescent externalizing behavior (see Figure 2, “1” paths) in the general population. To this end, aim 1 hypotheses, grounded in person-environment and family communication theories, will be tested using structural equation modeling (SEM). Each theory is directly related to the proposed dissertation model in Figure 2. The *rationale* for this aim is that its successful completion will determine the pattern of associations among the constructs in the general population. Its successful completion will also add to our knowledge of specific individual and family factors that contribute to adolescent adjustment. *The aim 1 sample, measures, and analysis plan described below have all been previously used in three studies* (Koh, Davis, et al., 2011; Koh, Koerner, et al., 2011; Koh & Rueter, in press).

## **AIM 1: JUSTIFICATION AND FEASIBILITY**

***Personality: Review of the Relevant Literature.*** A clear operationalization of personality is needed to understand the foundation upon which the “1” paths are built (see Figure 2). Specifically, a two-level conceptualization of personality informs the dissertation research proposed in this application: dispositional traits and characteristic adaptations. Dispositional traits are expressed as characteristic adaptations in any given context. After decades of descriptive research, personality researchers have converged on a basic personality trait structure. The most common is the Five-Factor model (FFM) or Big Five trait taxonomy: Openness/Intellect, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (John, Naumann, & Soto, 2008). Childhood temperament research has not yet identified a common structure, with five primary competing temperament models in existence: (1) Thomas & Chess, (2) Buss & Plomin’s *EASI* model, (3) Rothbart, (4) Kagan’s inhibition model and, (5) Cloninger’s 7-factor). Of the five, Rothbart’s research has been most successful in demonstrating conceptual links between childhood temperament and adult personality (Shiner & DeYoung, in press).

Earlier child temperamental traits later develop into adult personality, characterized by the Big Five (Rothbart, Ahadi, & Evans, 2000; Shiner & DeYoung, in press). For example, negative emotionality (comprised of three lower order facets: aggression, alienation, and stress reactivity) broadens into adult Neuroticism (Shiner & DeYoung, in press). Thus, personality will be used to refer to child temperamental traits hereafter.

***Goodness of Fit: Review of Relevant Literature.*** The trait (e.g., aggression and alienation) to communication and conflict “1” paths are supported by goodness of fit theory (Lerner, 1993; Thomas & Chess, 1977). Traditionally, this theory proposes that a good “fit” between child characteristics and parental demands contributes to optimal child functioning. Supported by this perspective, these specific Figure 2 “1” paths propose that the “fit” between individual personality traits (e.g., aggression) and (a) communication and, (b) conflict contributes to adjustment outcomes. To the extent that individual traits “fit” with parent-child communicative interactions, positive child outcomes are optimized. Thus, this application provides clear justification for conceptualizing the “1” trait paths (see Figure 2) in a goodness of fit framework.

***Person-Environment Theory: Review of Relevant Literature.*** The communication (adolescent and parent) to adolescent conflict and externalizing “1” paths are supported by this theory. Person-environment transactional theory (Caspi et al., 1987, 1988; Sameroff, 1975; Scarr & McCartney, 1983) may explain how parent-child interactions contribute to the process of children shaping their own behavioral outcomes (Bell, 1968; Lewis, 1981). Empirical support from family transactional (Patterson, 1982) and parent-child reciprocal effects research (Rueter & Conger, 1998) support a person-environment transactional framework. Mounting evidence suggests that reciprocal parent-child interactions influence behavior over time (Conger & Ge, 1999; Kim, Conger, Lorenz, & Elder, 2001; Larsson, Viding, Rijdsdijk, & Plomin, 2008; Rueter & Conger, 1998). For example, Kim et al. (2001) found evidence of a maladaptive negative emotion reciprocal influence in parent-adolescent interactions. Similarly, Rueter and Conger (1998) found maladaptive reciprocal effects whereby negative, inconsistent parenting led to a decrease in positive adolescent behavior, and positive, nurturant parenting led to an increase in negative adolescent behavior. Taken together, these empirical findings support a person-environment transactional framework. Moreover, they provide theoretical justification for how this theory explains the communication (adolescent and parent) to adolescent conflict and externalizing “1” paths depicted in Figure 2.

***Family Communication Patterns Theory: Review of Relevant Literature.*** Two specific aspects of the “1” paths (see Figure 2) are supported and justified by Family Communication Patterns Theory (FCPT; Koerner & Fitzpatrick, 2002a, 2002b, 2004, 2006). First, FCPT, provides support for the communication to conflict to externalizing “1” paths. General family communication, as conceptualized by FCPT, is more likely to predict specific communication, such as conflict (see Figure 2, “1” paths). FCPT is also inherently transactional. Empirical research clearly demonstrates that the quality of family communication is related to child adjustment (Rueter & Koerner, 2008; Steinberg, 2001). Building on existing family communication theories (McLeod & Chaffee, 1972,

1973), FCPT posits that creating a Family Shared Social Reality (FSSR), defined as family members' shared perceptions and evaluations of the social world that involve cognitive processes, is central to healthy family functioning and child well-being. To the extent that families are able to create a FSSR, positive outcomes ensue. There is some preliminary support for the importance of general communicative openness in predicting adjustment outcomes. For example, a study by Rueter & Koerner (2008), which used FCPT as its theoretical framework, found that adolescents in adoptive families that deemphasized openness were at a significantly greater risk for externalizing problems than adolescents in adoptive families that emphasized open communication.

Second, FCPT provides theoretical justification for the adolescent and parent communication measurement approach in my proposed dissertation research. Specifically, FCPT is based on two primary processes that are conceptualized along a continuum from high to low: *Conversation* and *Conformity*. The *Conversation* orientation is characterized by frequent, spontaneous, and open interactions among family members; the *Conformity* orientation is characterized by shared attitudes, beliefs and values. In summary, FCPT, together with preliminary support from Rueter & Koerner (2008), provides justification for testing a hypothesized process whereby *Conversation*-oriented communication predicts both adolescent conflict and externalizing behavior (as illustrated in Figure 2, "1" paths).

***Hypothesis 1.1: Review of Relevant Literature.*** Previous research that has established associations between adolescent negative emotionality and (a) adolescent conflict (Barber, 1994; Deković, 1999; Eisenberg et al., 2008) and (b) adolescent externalizing (Eisenberg et al., 2008) provides justification for the "1" paths (see Figure 2). In fact, the Big Five have been broadly associated with externalizing behavior in the general population (DeYoung, Peterson, Séguin, & Tremblay, 2008). More specifically, negative emotionality (part of Neuroticism) and parent-child conflict are associated with adjustment (Eisenberg et al., 2000, 2009; Rhee, Cosgrove, Schmitz, Haberstick, Corley, & Hewitt, 2007). For instance, higher levels of negative emotionality have been associated with more problem behaviors (Eisenberg et al., 2000). Yet a previous study by Koh & Rueter (in press) found that of the three lower order negative emotionality factors (aggression, alienation, and stress reactivity), only aggression contributed to both conflict and externalizing behaviors.

Little is known about how personality directly influences actual behavior (Back, Schmukle, & Egloff, 2009). For instance, scarce research exists examining the relationship between personality and family communication (Huang, 1999; Leung and Bond, 2001; McCrosky, Heisel, and Richmond, 2001). Of these, only McCrosky et al. (2001) assessed traits that can be mapped to the Big Five. Specifically, McCroskey et al. (2001) used Eysenck's Big Three (Extraversion, Neuroticism, and Psychoticism<sup>1</sup>) to examine correlations between the Big Three and communication-related variables. They found that "neurotic introverts" were more apprehensive about communication. These

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<sup>1</sup> Eysenck's Psychoticism maps to Agreeableness and Conscientiousness in the Big Five (John et al., 2008).

findings suggest that neuroticism is negatively correlated with communication. Adult neuroticism evolves out of earlier negative emotionality traits (Shiner & DeYoung, in press). Scant research exists about how parent traits predict adolescent outcomes, such as adolescent conflict and externalizing behavior. As discussed above, there is clear evidence from the transactional literature that parents have an influence on behavioral outcomes.

A study by Huang (1999) used FCPT as a theoretical framework to suggest that family communication predicts personality. Theoretically, individual traits and communicative behavior reciprocally influence each other over time; as a result, discerning the direction of effects may be challenging. Without a longitudinal study to establish the direction of effects and/or provide support for reciprocal effects (e.g., using a cross-lagged model), personality traits more likely predict communication (than vice versa). Due to its established heritability, traits exist prior to the development of FCPT derived communication.

Finally, previous research by Koh & Rueter (in press) found that adolescent conflict mediated the relationship between parent-adolescent aggression and adolescent externalizing behavior. In summary, the empirical research cited justifies the hypothesized “1” paths in Figure 2.

***Hypothesis 1.1: Review of Preliminary Studies.*** Recent studies by Koh and her colleagues provide additional support for the inclusion of adolescent aggression and parent alienation traits, and demonstrate my ability to test the 1.1 hypotheses. One preliminary study by Koh, Davis, et al. (2011) justifies inclusion of adolescent aggression in the proposed Figure 2 process. This study found that adolescent aggression accounted for variance in adolescent conflict. Another preliminary study by Koh, Koerner et al. (2011) also found support for the salience of adolescent aggression in family communication. In several parent-adolescent models (e.g., mother-younger adolescent, mother-elder, etc.), they found that aggression emerged as the salient trait for both younger and elder adolescents in predicting their *Conversation*-oriented behavior toward each family member. The *Conversation* orientation is characterized by frequent, spontaneous, and unconstrained interactions among family members. Family members with aggressive or alienating tendencies may inhibit this communicative dimension and, therefore, predict the low end of *Conversation*. Of the two, aggression emerged as the salient factor. Aggression is a lower order facet of higher order negative emotionality – a factor that maps to Neuroticism, one of the Big Five (John et al., 2008). Taken together, these findings justify inclusion of adolescent aggression in the proposed process (see Figure 2).

The same preliminary study by Koh, Koerner et al. (2011) also provides justification for inclusion of parent alienation in the Figure 2 model. Again, families low in *Conversation* will be less open and have less frequent interactions. Family members with aggressive or alienating tendencies may inhibit this communicative dimension and, therefore, predict the low end of *Conversation*. Alienation is a lower order facet of higher order negative

emotionality – a factor that maps to Neuroticism, one of the Big Five (John et al., 2008). Of the four tested parent traits in Koh, Koerner et al. (2011), only alienation and absorption predicted each parent's dyadic communicative behavior (again, toward each family member). However, the finding was more consistent for parent alienation across *Conversation* models. In summary, this preliminary support justifies inclusion of parent alienation in the Figure 2 model and also demonstrates my ability to test these hypotheses.

***Hypothesis 1.2: Review of Relevant Literature.*** Earlier research suggesting that family communication is directly associated with both adolescent conflict (Rueter, Keyes, & Koerner, 2009) and adolescent adjustment (Rueter & Koerner, 2008) justifies inclusion of these constructs in the Figure 2 model. Less is known about how general family communication predicts specific family interactions such as parent-child conflict. However, it is reasonable to expect that general communication would predict specific interactions (e.g., conflict).

***Hypothesis 1.3: Review of Relevant Literature.*** Adolescent conflict is associated with poor adjustment (Eisenberg et al., 2008; Koh & Rueter, in press). Behavior genetics research has established the association between conflict and externalizing outcomes (Burt, Krueger, McGue & Iacono, 2003; Burt, McGue, Krueger, & Iacono, 2005; Eisenberg et al., 2008; Koh & Rueter, in press). Taken together, these findings justify testing this hypothesis.

### ***Aim 1: Research Design.***

***Aim 1: Participants.*** A comparative adoptive and non-adoptive sample (or adoption design) is needed to achieve my previously stated aim 1 expected outcome. Using an adoption design will enable me to first understand general population processes, and later compare them to adoptive ones. As mentioned above, data for this study will come from the Sibling Interaction and Behavior Study (SIBS; McGue et al., 2007). *This is the same sample I have used in previous studies (Koh, Davis, et al., 2011; Koh, Koerner, et al., 2011; Koh & Rueter, in press), so I am very familiar with it.* SIBS is a longitudinal study that examines sibling and family influences on adolescent outcomes. All participating families at intake (N = 617) had at least one parent and two adolescent siblings (M = 14.9 years, SD = 1.9). Families had different genetic relatedness structures: (a) both adolescents were parents' genetic offspring (N = 208); (b) both adolescents were adopted (N = 285) and; (c) one adolescent was genetic offspring, and the other was adopted (N = 124). Adolescents in the study sample (N = 1232; 692 adopted, 540 nonadopted) were 54.8% female, 53.8% Caucasian, 37.4% Asian, and 8.8% another ethnicity. Of the 692 adopted adolescents, 74% (N = 514) were international adoptions (89.7% Asian, N = 461) and 26% (N = 178) domestic. The aim 1 study will use data from the mother, father, and elder adolescent.

**Statistical power and sample size:** Based on adequate power from previous studies using the same variables (Koh, Davis, et al., 2011; Koh, Koerner, et al., 2011; Koh &

Rueter, in press), it is anticipated that the *a priori* aim 1 power analysis will confirm that  $N = 616$  is a sufficient sample size. However, an *a priori* power analysis will still be conducted to determine the sample size needed using a Monte Carlo simulation study (Muthén & Muthén, 2002) in Mplus (version 6.0, Muthén & Muthén, 1998-2010). There are three steps in the simulation study. First, each parameter (e.g., standard deviations,  $\beta$ ,  $\lambda$ ,  $\delta$ ,  $\epsilon$ ) in the model (e.g., Figure 3) will be estimated based on previous research. Next, *a priori* parameter estimates will be used as starting values to estimate model population parameters and standard error biases assuming normality and using full-information maximum-likelihood estimation (FIML; Muthén & Shedden, 1999; Schafer & Graham, 2002). To ensure stability of the simulation study results, 10,000 replications of randomly drawn samples will be iteratively drawn. Finally, three criteria will be used to determine sample size: (1) model parameter biases (standard error biases for each parameter in the model may not exceed 10%), (2) standard deviation biases (standard error biases for each standard deviation per parameter may not exceed 5%) and, (3) confidence interval coverage for the proportion of replications should be within .91 and .98 (indicating that 91-98% of the replications estimate the true population parameter within a 95% confidence interval). When all three criteria are met, the sample size closest to a power of .80 will be selected; this value is consistent with conventional practice used in detecting effect sizes (Cohen, 1992).

***Aim 1: Measures.*** I have used all aim 1 measures in three previous studies (Koh, Davis, et al., 2011; Koh, Koerner, et al., 2011; Koh & Rueter, in press), so I am very familiar with the measures and their psychometric properties.

*Personality traits* will be assessed using the Multidimensional Personality Questionnaire (MPQ; Tellegen & Waller, 2008) or the Personality Booklet – Youth Abbreviated (PBYA; Tellegen & Waller, 2008). This measure was used in Koh, Davis, et al. (2011) and Koh, Koerner, et al. (2011). The MPQ is a comprehensive factor-analytically developed self-report measure of higher and lower order personality traits. The PBYA is a shortened, 133-item version of the MPQ for adolescents under 16 years of age. All questionnaire items used a 4-point scale ( $1 = \text{definitely false}$  to  $4 = \text{definitely true}$ ) and were reverse coded as necessary so that high scores reflected high levels of a given trait. Adolescent aggression, and mother and father alienation will be assessed. *Aggression* measures proclivities toward physical/cognitive aggression and includes items such as “When someone hurts me, I try to retaliate (get even),” and “When I get angry I am often ready to hit someone.” *Alienation* measures feelings of estrangement/victimization and includes items like “People often try to take advantage of me” and “Some people oppose me for no good reason.”

*Family communication* is defined as *Conversation-oriented* communication as conceptualized by FCPT (frequent, open, unconstrained communication). This measure was previously used in Koh, Koerner, et al. (2011). It will be assessed using trained observers’ global ratings of dyadic (e.g., adolescent to mother, father to adolescent, etc.) family interaction tasks from the Sibling Interaction and Behavior Rating Scales (SIBRS;

adapted from the Iowa Family Interaction Rating Scales, Melby et al., 1998). All SIBRS are based on the following scale: *1 = not at all characteristic* to *9 = mainly characteristic*. The *Conversation* dimension, as conceptualized by FCPT, will be measured using factor scores of *Warmth*, *Listening Responsiveness*, and *Communication* rating as indicators for each family member's observed behavior on the *Conversation* dimension. *Warmth* is defined as the expression of care, concern, support, or encouragement; *Listening Responsiveness* is defined as verbal or nonverbal listener responsiveness indicating attentiveness and; *Communication* is clear/appropriate, neutral or positive expression of point of view, needs, wants, etc. Each factor score represents the observed behavior of each family member toward each family member. Factor scores are composite variables comprised of each individual's observed score placement on a latent factor (Tabachnick & Fidell, 2007). For example, the mother *Warmth* factor score consists of the mother to father, mother to elder, and mother to younger *Warmth* observer ratings. To create the mother *Conversation* latent variable, mother *Warmth*, *Listening Responsiveness*, and *Communication* factor scores served as indicators of the mother *Conversation* latent variable. The use of factor scores as indicators of the *Conversation* latent variable allows this variable to be represented as a second-order latent structure. To assess the reliability of all observed scales, random secondary observers rated 25% of all interactions; these secondary ratings will be compared to the primary ratings using Interclass Correlations (Shrout & Fleiss, 1979; Suen & Ary, 1989).

*Adolescent conflict*, defined as hostile, angry, and coercive adolescent (younger, elder) behavior directed toward each parent, will be assessed using trained observers' ratings from the Sibling Interaction and Behavior Rating Scales, adapted from the Iowa Family Interaction Rating Scales (IFIRS; Melby et al., 1998). This measure was previously used in Koh, Davis, et al. (2011) and Koh & Rueter (in press). Two ratings (*1 = not at all characteristic* to *9 = mainly characteristic*) of dyadic interactions were taken. First, trained observers rated each adolescent's *Hostility* (hostile, angry, and critical behavior) toward the mother and father. Second, observers rated each adolescent's *Angry Coercion* (attempts to control and/or change behavior or opinions marked by anger and contempt) toward the mother and the father. Each set of scores will be summed to create measures of younger adolescent to mother, younger adolescent to father, elder adolescent to mother, elder adolescent to father for *Hostility*, *Angry Coercion* – resulting in eight dyadic variables (e.g., younger adolescent hostility to mother, younger adolescent hostility to father, younger adolescent angry/coercion to mother, younger adolescent angry/coercion to father) that will be used as indicators of the Observed Adolescent Conflict latent construct. Reliability for all observed scales is assessed as described above.

*Adolescent externalizing behaviors* are defined as antisocial, aggressive and delinquent behaviors in multiple contexts including home, school, and the community. This measure was previously used in Koh & Rueter (in press). Using The Delinquent Behavior Inventory (DBI; Gibson, 1967), adolescents reported how often they engaged in 36 behaviors, including “smashing, slashing, or damaging things,” “cutting classes at school,” “stealing things,” and “using any kind of weapon in a fight” (*1 = never*, *2 =*



once, and 3 = more than once). Responses will be summed and used as the first indicator of Adolescent Externalizing ( $\alpha = .89$ ). Symptom counts from the Diagnostic Interview for Children and Adolescents – Revised (DICA-R; Welner et al., 1987) will be used to create the second indicator of Adolescent Externalizing. Trained interviewers administered the DICA-R to the adolescent and his/her mother. Symptoms of ADHD, CD, and ODD reported by either the adolescent or mother were summed ( $M = 5.05$ ,  $SD = 5.74$ ). The third indicator of Adolescent Externalizing will consist of a 67-item behavior checklist adapted from Conner’s Teacher Rating Scale (Conner, 1969) and the Rutter Child Scale B (Rutter, 1967). Three teachers were nominated by each adolescent, contacted, and asked to complete the survey. Items were rated on a 4-point scale ( $1 = \textit{not at all characteristic}$  to  $4 = \textit{very much characteristic}$ ) and included “is defiant,” “has difficulty concentrating on schoolwork,” “is often truant,” “initiates physical fights,” and “obeys the rules” (reverse coded). Responses from individual teacher ratings will be summed and the average of summed teacher ratings’ for each adolescent will be used as a third indicator of the latent factor.

### ***Aim 1: Analysis Plan.***

***Data Screening:*** Data screening for normality, outliers, linearity, homoscedasticity, ill-scaling, multicollinearity, and missing data (Kline (2005) has been previously conducted in studies by Koh, Davis, et al., (2011), Koh, Koerner, et al. (2011), and Koh & Rueter (in press). Missing data screening revealed no systematic patterns of missingness, or a Missing At Random (MAR) pattern where missingness is unrelated to any variables of interest after holding the other variables in the data set constant (Acock, 2005). Convention holds that the MAR mechanism is “ignorable” because it will not bias parameter estimation, threaten internal and external validity, or increase the likelihood of Type I and Type II errors (Collins, Schafer, & Kam, 2001; El-Masri & Fox-Wasylyshyn, 2005; McKnight, McKnight, Sidani, & Figueredo, 2007; Padilla & Algina, 2004) – as Missing Not At Random (MNAR) patterns might. Therefore, missing data will be estimated by adjusting model parameters using full-information maximum-likelihood estimation (FIML; Muthén & Shedden, 1999; Schafer & Graham, 2002) in Mplus. Reliable estimation in Mplus requires that the proportion of available data for each study variable and between each pair of variables is at least .10. Based on previous analyses using similar variables (Koh, Davis, et al., 2011; Koh, Koerner, et al., 2011; Koh & Rueter, in press), proportions in these studies ranged from .53 to 1.00, with the vast majority above at least .85.

***Hypothesis Testing:*** Testing my aim 1 hypotheses will consist of two steps that are similar to those I have used in previous studies (Koh, Davis, et al., 2011; Koh, Koerner, et al., 2011; Koh & Rueter, in press). Separate mother-elder adolescent and father-elder adolescent models will be tested. First, I will test a base model (not depicted in Figure 1), in which adolescent aggression, adolescent conflict, and adolescent externalizing will each be regressed on two control variables: age and gender. This will allow me to determine the amount of variance in each latent construct due to age and gender. In step two, I will test the “1” paths depicted in Figure 2. This step will allow me

to determine the amount of variance in each construct beyond age and gender. Structural equation modeling (SEM) will be conducted using MPlus (version 6.0, Muthén & Muthén, 1998-2010).

***Aim 1: Interpretation of Results.*** Study results will be examined using widely accepted data interpretation approaches (e.g., explained variance) previously used in earlier studies (Koh, Davis, et al., 2011; Koh, Koerner, et al., 2011; Koh & Rueter, in press). Each step model will be examined for model fit using the following criteria: (1) a statistically significant  $\chi^2$  (Bollen, 1989); (2) a comparative fit index (CFI) and (3) Tucker-Lewis index (TLI) above .90; (4) a root mean square error of approximation (RMSEA) less than .08 and; (5) a standardized root mean square residual (SRMR) less than .06 (Hu & Bentler, 1999). Standardized coefficients ( $\beta$ ) based on  $t$ -values greater than 1.96 ( $p < .05$ ), statistically significant  $R^2$  ( $p < .05$ ) values, and changes in  $R^2$  at each step.

***Aim 1: Expected Outcomes.*** The *aim 1 outcome* is to gain the foundation necessary (by testing the hypothesized aim 1 associations) to determine the role that adolescent and parent personality play in the overall proposed Figure 2 process.

***Aim 1: Potential Problems and Alternative Strategies.*** The sample size determined by the Monte Carlo simulation study may be larger than the sample size available using the Sibling Interaction and Behavior Study (SIBS; McGue et al., 2007). Although this is possible, it is unlikely given that previous research (Koh, Davis, et al., 2011; Koh, Koerner, et al., 2011; Koh & Rueter, in press) conducted using the same sample yielded significant results. In this unlikely event, the model will be adjusted to create one with sufficient power. For example, eliminating parameters will increase statistical power. In a proactive effort to increase statistical power, the aim 1 study will only include elder adolescents, resulting in a more parsimonious model. Finally, aim 1 results could reveal no statistically significant associations among the proposed constructs in Figure 2. Statistically significant findings from my preliminary studies (Koh, Davis, et al., 2011; Koh, Koerner, et al., 2011) suggest this is unlikely. If, however, this occurs, no variables will be dropped from the Figure 2 conceptual model because of the importance of including them in the theorized process (see Figure 1).

**Aim 2: Determine if adolescent and parent personality influence one another's communication within the Aim 1 proposed process (see Figure 2, "2" paths).**

H2.1 One family member's individual trait predicts another member's communication.

***Aim 2: Introduction.*** The aim 2 objective is to understand how family members potentially influence each other and to determine the role this plays in the general population in the proposed Figure 2 process. All aim 2 hypotheses will be tested using SEM. The *rationale* for this aim is that its successful completion will help determine whether individual family members' personality influences others' behavior in the general population. Its successful completion will add to our knowledge of individual traits that predict observed behavior. *The aim 2 sample, measures, and analysis plan described below have all been previously used in Koh, Koerner, et al., 2011.*

## **AIM 2: JUSTIFICATION AND FEASIBILITY**

***Theoretical frameworks: Review of Relevant Literature.*** Transactional (Caspi et al., 1987, 1988; Sameroff, 1975; Scarr & McCartney, 1983) and goodness of fit (Lerner, 1993; Thomas & Chess, 1977) theories help explain why individual traits may predict behavior – providing justification for aim 2 hypotheses. For instance, evocative gene-environment correlations (theorized within a transactional framework) suggest that different child personality traits may evoke varying parent responses in communicative interactions with their children. Theoretically, it is likely that personality plays a role in parent-child interactions, and that one influences the other over time. Goodness of fit theory (Lerner, 1993; Thomas & Chess, 1977) may also help explain the hypothesized cross effects depicted in Figure 2 (see “2” paths). Traditionally, this theory proposes that a good “fit” between child characteristics and parental demands contributes to optimal child functioning. Consistent with this perspective, the Figure 2 model proposes that the “fit” between child personality traits (e.g., aggression) and dyadic interactions (e.g., communication or conflict) may contribute to adjustment outcomes. To the extent that individual traits “fit” with parent-child communicative interactions (e.g., evoke positive responses), positive child outcomes are optimized. In summary, both theories provide theoretical support and justification for the “2” paths depicted in Figure 2.

***Hypothesis 2.1: Review of Relevant Literature.*** Empirical research supports parent-child reciprocal effects (Conger & Ge, 1999; Kim, Conger, Lorenz, & Elder, 2001; Larsson, Viding, Rijdsdijk, & Plomin, 2008; Rueter & Conger, 1998) and the feasibility of testing this hypothesis. Additionally, child personality and adult personality may interact in a family transactional environment (Asendorpf & Van Aken, 2003; Komsu et al. 2008). That parent traits and characteristics also contribute to child outcomes (Belsky, 1984; Eisenberg et al., 1999) provides further justification for aim 2.

***Hypothesis 2.1: Review of Preliminary Research.*** A preliminary study by Koh, Koerner et al. (2011) demonstrates my ability to test this hypothesis. Specifically, we found support for an association between (a) adolescent aggression and dyadic communication and, (b) parent alienation and dyadic communication.

### ***Aim 2: Research Design.***

***Aim 2: Participants.*** Aim 2 will be accomplished using the same sample as described in aim 1.

***Aim 2: Measures.*** Aim 2 will be accomplished using the same measures described in aim 1.

### ***Aim 2: Analysis Plan.***

1. *Data Screening:* The same procedures will be followed as described above in aim 1.

*Missing Data:* The same procedures will be followed as described above in aim 1.

*Hypothesis Testing:* I have used the same aim 2 analysis plan in Koh, Koerner et al. (2011). Testing my aim 2 hypotheses will consist of adding the “2” paths (see Figure 2) to the model described in the aim 1. This will allow me to determine both the amount, and change in variance in each construct due to cross effects (above and beyond any main adolescent and/or parent effects). Separate mother-elder adolescent and father-elder adolescent models will be tested.

*Aim 2: Interpretation of Results.* Aim 2 results will be evaluated based on changes in  $R^2$ . Model fit and statistical significance will be evaluated as described in aim 1.

*Aim 2: Expected Outcomes.* The *aim 2 outcome* is to gain an understanding of how family members potentially influence one other and to determine the role this plays in the proposed Figure 2 process.

*Aim 2: Potential Problems and Alternative Strategies.* See aim 1 above.

**Aim 3: Determine the effects of adoption status on components of the Aim 1 proposed process (see Figure 2, “3” paths).**

H3.1: Adoption status moderates the relationship between personality and communication, and personality and conflict.

H3.1a: Adoption status moderates the association between adolescent aggression and conflict.

H3.1b: Adoption status moderates the association between adolescent aggression and adolescent communication.

H3.1c: Adoption status moderates the association between parent alienation and parent communication.

H3.2: Adoption status is associated with adolescent conflict and externalizing.

H3.3: Adoption status is indirectly associated with adolescent externalizing through conflict (not shown in Figure 2).

*Aim 3: Introduction.* The need for explanatory models using an adoptive and non-adoptive sample to advance our understanding of adopted adolescent adjustment justifies testing aim 3 hypotheses. Previous research testing patterns of associations among the “1” and “2” path constructs in Figure 2 have either used general population or primarily adoptive family samples, precluding them from understanding the role of adoption status. Of the handful of existing studies (e.g., Grotevant, Rueter, Von Korff, & Gonzales, in press; Rueter, Koh, Grotevant, & Wrobel, 2011) that test explanatory models of adopted adolescent externalizing behaviors, most use an adoptive sample (e.g.,

Minnesota-Texas Adoption Research Project) – limiting comparisons with the general population. Although adoption design samples collected by behavior genetics researchers are able to make such comparisons (because of the inclusion of adoptive and non-adoptive families), their studies are specifically designed for estimating heritability parameters (e.g., shared and non-shared environment estimates). Adoption design studies have not focused on identifying family processes that contribute to adopted adolescent outcomes. These samples have been criticized for their homogeneity, or range of restriction, potentially biasing parameters and limiting generalizability. However, the limited range restriction in the SIBS sample was not found to bias parameter estimation (e.g., attenuated adoptive sibling correlations for delinquency; McGue et al., 2007). Therefore, the aim 3 “3” paths are added to determine whether adoption status contributes above and beyond the proposed process in the general population (indicated by the “1” and “2” paths in Figure 2). All aim 3 hypotheses will be tested using SEM. The *aim 3 rationale* is that its successful completion will help determine whether being adopted makes a difference in family processes contributing to negative adjustment outcomes. Its successful completion will add to our knowledge of specific individual and family factors that contribute to adopted adolescent externalizing behaviors. *The aim 3 sample, measures, and analysis plan described below have all been previously used in Koh, Davis et al., 20011; Koh, Koerner, et al., 2011; Koh & Rueter, in press.*

### **AIM 3: JUSTIFICATION AND FEASIBILITY**

***Heritability: Review of relevant Literature.*** The fact that all of the Figure 2 constructs have some degree of heritability or genetic foundation justifies the need to test the role of adoption status as outlined in aim 3 hypotheses. Behavior genetics research has established a genetic component to (a) personality (heritability estimates range from 40% to 80%; Krueger et al., 2008; Reimann et al., 1997); (b) the association between parent-child conflict and externalizing outcomes (Burt, Krueger, McGue, & Iacono, 2003; Burt, McGue, Krueger, & Iacono, 2005) and; (c) externalizing behaviors (Burt et al., 2007). None of these studies *explained* how each construct and/or association may contribute to an increase in negative adolescent adjustment outcomes. Because of the underlying heritability in these Figure 2 constructs and/or associations, adoptive children and parents are less likely to share similar personalities and/or communication styles. This alone underscores the need to understand how adoption status contributes to the aim 1 and 2 associative patterns.

***Hypothesis 3.1: Review of the Literature.*** Because personality research has not been integrated into adoption family research, little is known about how individual family members’ traits are moderated by adoption status. However, preliminary studies described below provide justification for testing possible moderating effects outlined in the 3.1 hypotheses.

***Hypothesis 3.1: Review of Preliminary Studies.*** Preliminary evidence from a study by Koh, Davis et al. (2011) demonstrates my ability to test the 3.1 hypotheses. Specifically, Koh, Davis et al. (2011) found evidence of a moderating effect of adoption

status (in the direction of adoptees) on adolescent aggression and adolescent conflict. This preliminary study justifies the need to further explore how adoption status moderates the magnitude of the relationship between personality and (a) communication and, (b) conflict.

**Hypothesis 3.2: Review of Relevant Literature.** Research using adoption samples to examine family communication and conflict justifies the need to clarify the role of adoption status. For instance, Rueter, Keyes et al. (2009) found higher levels of parent-adolescent conflict in adoptive families than in non-adoptive ones. They also found that conflictual interactions in adoptive families were limited to adolescent behavior directed toward each parent. Another comparative study by Lansford, Ceballo, Abbey, & Stewart (2001) that studied parent-child conflict, found that adoptive mothers reported more parent-child disagreements than non-adoptive mothers. However, the latter two studies were descriptive and did not test processes that may help explain these differences or clarify the role of adoption status. Finally, Koh & Rueter (in press) found evidence of a direct relationship between adoption status and (a) adolescent conflict and, (b) externalizing. In summary, previously cited empirical research supports testing this hypothesis.

**Hypothesis 3.3: Review of the Literature.** Previous research juxtaposed with a recent study by Koh & Rueter (in press) provides justification for testing this hypothesis. Specifically, earlier descriptive reports of a direct association between adoption status and externalizing behavior was not replicated in a recent study by Koh & Rueter (in press). Instead, we found an indirect relationship (mediated by adolescent conflict) between adoptive status and externalizing behaviors – suggesting a more complex, mediated process. If replicated, this study’s findings demonstrate that being adopted alone is unlikely to explain an adolescent’s externalizing behavior. Because of the overabundance of descriptive studies, and the scarcity of explanatory studies, it is not surprising that more complex processes may begin to emerge as research advances to explaining the increased risk of poor adopted adolescent adjustment outcomes. More is clearly needed to better understand how adoption status may contribute to adopted adolescent behavior. Aim 3 takes the next, necessary step to advance this research area.

### ***Aim 3: Research Design.***

***Aim 3: Participants.*** The aim 3 sample will be the same as described in aim 1 (see above).

***Aim 3: Measures.*** In addition to the measures outlined in aim 1, Adoption status will be assessed using a categorical variable where 1 = *adopted* and 2 = *not adopted*. This variable has been used in three previous studies (Koh, Davis, et al., 2011; Koh, Koerner, et al., 2011; Koh & Rueter, in press).

### ***Aim 3: Analysis Plan.***

*Data Screening:* The same procedures will be followed as described above (see aim 1 analysis plan).

*Missing Data:* The same procedures will be followed as described above (see aim 1 analysis plan).

*Hypothesis Testing:* I have used the aim 3 analysis plan in three previous studies (Koh, Davis et al., 2011; Koh, Koerner, et al., 2011; Koh & Rueter, in press). Testing my aim 3 hypotheses will consist of adding the “3” paths (see Figure 2) to the model described in the aim 2 analysis plan. This will allow me to determine both the amount and change in variance ( $\Delta R^2$ ) in each construct due to three possible effects: (a) an interaction effect between adoption status and personality, (b) a main effect between personality and a given outcome (e.g., adolescent communication, adolescent conflict, etc.), or (c) the direct effect of adoption status on a given outcome. Additionally, adding the “3” paths to my hypothesized process will help determine if the proposed general population process (tested in aims 1 and 2) holds. All interaction terms will be centered (as previously done in Koh, Davis et al., 2011) Separate mother-elder adolescent and father-elder adolescent models will be tested.

*Aim 3: Interpretation of Results.* Aim 3 results will be evaluated based on changes in  $R^2$ . Model fit and statistical significance will be evaluated as described in aim 1.

*Aim 3: Expected Outcomes.* The *aim 3 outcome* will clarify the role of adoption status in the proposed Figure 2 process.

*Aim 3: Potential Problems and Alternative Strategies.* See aim 1 above.

*Study Timeline.* (see Table 2 below)

*Future Directions.* The work proposed in this application will lay the foundation for the next needed steps in my overall research program to achieve my long-term goal of developing interventions to reduce adopted adolescent externalizing behaviors. The next logical step is to test adolescent-parent personality similarity. Research proposed in this application is grounded in the premise that adoptive parents and children are more likely to have dissimilar personalities. This hypothesis can and should be tested. Methods for evaluating personality similarity per Furr (2008) can guide such future work. Second, inclusion of additional traits (e.g., parent absorption) should be tested based on the Figure 2 proposed process. For parsimony, parent absorption was not included. Support from preliminary studies (Koh, Koerner, et al., 2011) suggests that both mother (additive main effect) and father absorption (additive cross effect) contribute to the hypothesized process tested in this application.

Table 2. Study timeline.

Task	May 2011	Jun 2011	Jul 2011	Aug 2011	Sept 2011	Oct 2011	Nov 2011	Dec 2011	Jan 2012	Feb 2012	Mar 2012	Apr 2012
Submit IRB waiver	←→											
Literature review	←→	→										
Power analysis		←→										
Analyses			←→	→								
Write Introduction				←→								
Write Methods					←→							
Write Results						←→						
Write Discussion							←→					
Complete first draft												
Revise first draft								←→	←→			
Submit final draft to committee											←→	
Dissertation defense												←→



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## APPENDIX B

### Addendum to Dissertation Proposal

**Aim 2: Determine if adolescent and parent personality influence one another's communication within the aim 1 proposed process (see Figure 2, "2" paths).**

H2.1 One family member's individual trait predicts another member's communication.

H2.2 One family member's individual trait will interact with another member's trait and moderate an outcome (e.g., communication, conflict, or externalizing).