

**Treatment outcomes of an attachment-based parenting  
program for biological mothers versus fathers**

**by**

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## Ethics Statement



The author, whose name appears on the title page of this work, has obtained, for the research described in this work, either:

- a. human research ethics approval from the Simon Fraser University Office of Research Ethics,

or

- b. advance approval of the animal care protocol from the University Animal Care Committee of Simon Fraser University;

or has conducted the research

- c. as a co-investigator, collaborator or research assistant in a research project approved in advance,

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## **Abstract**

Mothers rather than fathers typically attend parenting interventions. Consequently, research investigating outcomes of parenting programs generally reflect outcomes for mothers only and relatively little is known about engagement of and outcomes for fathers. The present study focused on investigating outcomes of an attachment-based parenting intervention for biological mothers (n = 630) and fathers (n = 149). Outcomes for parents attending together were also investigated. Findings suggest that mothers and fathers, regardless of whether they attended together or alone, benefited similarly from participating in the intervention. These included benefits in youth affect regulation, parental satisfaction and efficacy, and reductions of parental-child aggressive behaviour. In contrast to these three consistent findings for fathers and mothers, participating biological mothers benefited more frequently than biological fathers across all other youth and parental outcomes investigated. Implications of these findings are discussed.

**Keywords:** Parenting; Gender; Biological Parents; Effectiveness

## Dedication

*This work is dedicated to my family. Thank you for being my lighthouse when in rough waters. To my wife, mom, dad, and brother.*

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# Chapter 1.

## Introduction

The quality of the parent-child relationship is a significant factor in determining children's present and future emotional and behavioural well being. In fact, parenting has been proposed as one of the most robust predictors, if not the most robust predictor, of a wide range of psychopathological outcomes in youth (Klahr & Burt, 2014). Research on this topic supports the association between the quality of the parent-child relationship and the onset and development of a range of internalizing (Groh, Roisman, van Ijzendoorn, Bakermans-Kranenburg, & Fearon, 2012) and externalizing psychopathology (Fearon, Bakermans-Kranenburg, van Ijzendoorn, Lapsley, & Roisman, 2010; Moretti & Peled, 2004). Moreover, specific parenting behaviours have also been found to be associated with an increased risk for the development of substance abuse (Ryan, Jorm, & Lubman, 2010), antisocial behaviour (Belsky, 1981; Stover et al., 2012), criminal activity (Hoeve et al., 2009), depression and anxiety (Yap, Pilkington, Ryan, & Jorm, 2014), and sexual risky behaviours later on in children's lives (de Graaf, Vanwesenbeeck, Woertman, & Meeus, 2011). These parenting behaviours include inconsistent parental discipline and monitoring, lack of warmth, harsh parenting, low degrees of positive parent-child interactions, and low parental involvement and support (Caspers, Cadoret, Langbehn, Yucuis, & Troutman, 2005; Gryczkowski, Jordan, & Mercer, 2010; Hartman et al., 2015; Pilgrim, Schulenberg, O'Malley, Bachman, & Johnston, 2006; Sluis, Steensel, & Bögels, 2015).

The majority of studies investigating the association between the quality of the parent-child relationship and youth's psychopathology pay particular attention to maternal parenting attitudes and behaviours (Barber, Stolz, Olsen, Collins, & Burchinal, 2005; Yin, Li, & Su, 2012). The complete or even partial disregard of paternal experiences in parenting and parent-child relationships potentially biases the findings

presented above and, whether intentionally or not, dangerously equates parenting with motherhood (Flouri & Buchanan, 2003). In addition, the disregard of paternal influences on parenting and, hence, on children's adjustment assumes fatherhood to be peripheral in the children's lives. Yet, although mothers traditionally spend more time with their children than do fathers, this does not necessarily preclude fathers from having a significant and influential parenting role.

Fortunately, through a realization of the above limitation in the parenting literature, an increased interest in the study of fatherhood has become evident in the last two decades. From this literature it has become apparent that fatherhood presents a unique perspective in parenting and, furthermore, that fathers' influence in children's psychosocial well-being is at least as significant as that of mothers (Amato & Gilbreth, 1999; Cabrera & Tamis-LeMonda, 2013; Lamb, 2010). In fact, as it is the case for the mother-child relationship, the quality of the father-child relationship has been found to be associated with both internalizing and externalizing problems in both young and older children (Flouri & Buchanan, 2003). The strength of this finding was such that it was still present even after statistically controlling for the variance contributed by mothers through the mother-child relationship. In addition, the significance of the father-child relationship has been bolstered through findings that have found paternal parenting to also predict cognitive and relational outcomes in children (Allen, Porter, McFarland, McElhaney, & Marsh, 2007; Flouri, 2010) as well as psychopathology that ranges from antisocial behaviours, to eating disorders (Blaze, Iacono, & McGue, 2008; Jones, Leung, & Harris, 2006). Overall, these findings suggest that fatherhood matters.

The importance of both maternal and paternal parent-child relationships for youth's present and future psychosocial well-being has drawn the attention of researchers and clinicians. In particular, it has become evident that enhancing the parent-child relationship can potentially improve children's present and future well-being. One of the ways in which clinicians and researchers have attempted to strengthen the parent-child relationship is through the use of parenting interventions. These interventions have consistently demonstrated to be effective in reducing children's externalizing behaviours, internalizing problems, substance use, and family conflict (Moretti & Obsuth, 2009; Nieuwboer, Fukkink, & Hermanns, 2013; Tarver, Daley,

Lockwood, & Sayal, 2014; Thomas & Zimmer-Gembeck, 2007). Although the mechanisms of change of parenting interventions are still under investigation, it is believed that change is driven, at least partly, by enhancements in attachment security, parenting skills, and children's social skills (Bakermans-Kranenburg, van Ijzendoorn, & Juffer, 2003; Barlow, Smailagic, Huband, Roloff, & Bennett, 2014; Barlow & Stewart-Brown, 2000; Moretti & Obsuth, 2009; Suchman, Decoste, Rosenberger, & McMahon, 2012; Taylor & Biglan, 1998; Van Zeijl et al., 2006). Interestingly, the benefits of participating in a parenting intervention are not limited to children's outcomes but also extend to parental outcomes. Namely, meta-analyses have found that parents and caregivers participating in parenting interventions experience less psychosocial difficulties including depression and anxiety symptoms, stress, anger and guilt (Barlow et al., 2014; Bennett, Barlow, Huband, Smailagic, & Roloff, 2013). Parental confidence and satisfaction with the parent-child and partner relationships are also positively impacted after participating in parenting interventions (Bennett et al., 2013).

Despite the demonstrated effectiveness of parenting interventions, the literature on the effectiveness of these programs appears to suffer the same limitation found in the parenting literature: the partial or complete disregard of fathers. In fact, meta-analyses conducted to investigate the effectiveness of parenting interventions have consistently concluded that very limited data is available to conclusively determine the effectiveness of these programs when it comes to participating fathers (Barlow et al., 2014; May et al., 2013; Panter-Brick et al., 2014). Beyond this limitation, initial analyses on the available data seem to indicate that parenting interventions are effective in positively altering both paternal and their children's behaviours and affect (Barlow et al., 2014; Panter-Brick et al., 2014). As expected, positive changes in parenting behaviour and affect are related to changes in children's internalizing and externalizing problems, affect regulation, and mood and anxiety levels. Furthermore, the beneficial effects of parental participation in parenting interventions have been evident in research evaluating parenting interventions for children at different stages of development (e.g., infants, adolescents) and for programs characterized by a range of theoretical approaches (Barlow et al., 2014). As pointed out above, although these results are encouraging, the available data on parental outcomes of parenting interventions is still in its infancy and more detailed investigations on this topic are necessary.

An additional limitation of the literature on the effectiveness of parenting interventions deals with the disregard of the possible additive or even exponential gains stemming from co-participation of parents in these programs. Given that most parenting interventions allow caregivers to participate in these programs alone or with one or more of their child's alternative caregivers, it is important to investigate if co-participation in parenting programs has any effect on program effectiveness for both children and caregivers. Moreover, given the diminishing dominance of nuclear families in Western countries and an increased presence of other family structures (e.g., single parent families, extended families, stepfamilies, etc.), it is noteworthy that the effectiveness of parenting interventions has mostly focused on mothers participating alone therefore paying no attention to the structure of their family nor the presence or absence of alternative caregivers.

## **1.1. Present Study**

The overall objective of the present study is to advance what we know about the effect of parental gender and co-participation for the effectiveness of a parenting intervention. To do this, the effectiveness of Connect (Moretti & Obsuth, 2009), a manualized attachment-based parenting intervention, will be studied (see the methodology section for details on the characteristics of the intervention).

Stemming from the overall objective of the study, two specific research questions will be investigated. First, I will investigate the effectiveness of Connect for biological mothers attending alone, biological mothers attending the intervention with the biological father of their child, biological fathers attending alone, and for biological fathers attending Connect with the other biological father of their child. This first research question will independently examine whether each of these groups of biological parents benefits from participating in Connect. Benefit will be defined as positive and significant pre- to post-treatment shifts in a set of parental and children's outcomes. For all research questions under investigation, children's outcomes refer to externalizing and internalizing problems, affect dysregulation, anxious and avoidant attachment, and aggressive behaviour toward their parent. Parental outcomes refer to parental mood, affect dysregulation, suppression and reflection, parental satisfaction and efficacy, and

parental aggressive behaviour toward their child. Both children's and parental outcomes were chosen given their relevance in the parenting literature and to the particular intervention evaluated in this study. Based on the literature on the effectiveness of parenting interventions, I expect to find that for the first research question biological mothers attending the intervention by themselves, biological fathers attending the intervention alone, and biological parents attending together experience benefits after participating in the program. This, I expect, will be true for each group of parents under investigation and across parental and children's outcomes.

The second aim of the study is to investigate the differential effectiveness of Connect across parental gender and or co-participation status. In other words, this second research question will examine whether biological mothers and fathers who attended Connect either alone or together benefit equally or not from the intervention. In contrast to the first research question, this second research question will attempt to discern whether there are between-group differences in relation to each of the outcomes under study. Hence, the examination of these between-group differences will be carried across each of the parental and children's outcomes investigated while taking into account dependencies in the data (see Data Analytic Method section below). By asking this second research question I will be able to investigate (a) whether the benefits obtained from maternal participation in a parenting intervention, if any, are superior, equal, or inferior to that of fathers and (b) whether co-participation of biological parents in an attachment-based parenting intervention has an effect on the effectiveness of the intervention. Given the lack of previous research investigating this research question, the direction of the findings associated with these analyses is unknown. Nonetheless, the expectation is that all groups of parents, independent of the nature of their participation in the parenting intervention, will benefit equally from the program.

## Chapter 2.

### Method

#### 2.1. Recruitment and Participants

Data for this study was drawn from a sample of parents and alternate caregivers who sought services from mental health, community, and educational centers in order to address their concerns about their child's behavioural and social-emotional problems. Parents interested in participating in a parenting intervention designed to address their concerns about their child were offered enrolment in Connect. Recruitment and data collection took place from Fall 2006 to Fall 2012.

A total of 2,475 biological parents related to 2,010 youth participated in Connect. The mean age of these participants was of 43.09 ( $SD = 7.02$ ). Six hundred and sixty one (26.7%) identified as male while 1,814 (73.3%) identified as female. In regard to ethnicity, most parents self-identified as Caucasian ( $n = 1,105$ , 44.6%), followed by Aboriginal ( $n = 144$ , 5.8%), Asian ( $n = 136$ , 5.5%), and other ( $n = 35$ , 1.4%). Ethnicity data was missing for 1,055 (42.6%) of the participants. Participants' reports on their children's characteristic revealed that the mean age of the youth represented in the program was of 13.92 years ( $SD = 2.65$ ). Youth's ethnicity as reported by their parents followed a similar pattern than the one reported by the parents about their own ethnicity. Namely, most parents indicated that their children were Caucasian ( $n = 855$ , 34.5%), followed by Aboriginal ( $n = 153$ , 6.2%), Asian ( $n = 125$ , 5.1%), and other ( $n = 44$ , 1.4%). Youth's ethnicity data failed to be reported by 1,308 (52.8%) participating biological parents. The mean grade level in school for the youth represented in the sample was of 8.09 ( $SD = 1.05$ ). In regard to family demographics, a slight majority of parents reported belonging to a one-parent family ( $n = 927$ , 37.5%), followed by two-

parent families ( $n = 916$ , 37.05%), and blended families ( $n = 54$ , 2.2%). Family configuration data was missing for 578 (23.4%) parents.

## **2.2. Intervention**

### **Connect**

Given the evidence supporting the importance of effective parenting and secure parent-child attachment as protective factors against behavioural and emotional difficulties in children, parents and caregivers in this study participated on an established attachment-based intervention that promotes these two protective factors to prevent and diminish serious behavioural problems in adolescents: Connect (Moretti & Obsuth, 2009). Designed to maximize uptake, penetration, and sustainability within communities, Connect is a 10-week manualized attachment-based parenting intervention for parents and caregivers of youth experiencing significant behavioural and mental health issues. This parenting intervention focuses on strengthening secure attachment through the enhancement of its building blocks: parental reflective function, parenting sensitivity, shared partnership and mutuality within the parent-teen relationship, and dyadic affect regulation. In each of its 10 sessions, this group program begins with a discussion of an attachment principle specifically focused on adolescence and common challenges in parent-teen relationships. Experiential exercises are used to help parents modulate their emotional reactions to their teens' problem behaviour, reflect on the attachment needs underlying their teens' problem behaviour, and respond with sensitivity while maintaining expectations and setting limits.

Unlike other parenting interventions, Connect does not focus on teaching parents specific techniques meant to manage their child's problem behaviour (e.g., setting ground rules, presenting logical consequences, using planned ignoring, etc.). Instead, Connect uses experiential techniques such as role plays and reflection exercises to allow parents to practice stepping back from their own emotional reactions to their teens' behaviour and to gain insight into their teen's state of mind and emotional experiences. These experiential techniques allow parents to learn new avenues through which they can respond to their teen's challenging behaviour with sensitivity and support



while maintaining clear limits and expectations. In addition, these techniques help parents regulate their own feelings of distress and anger toward their children and to become more available to step into their teen's state of mind by teaching parents to slow down and to focus first on their child's state of mind and attachment needs. It is expected that this will open new avenues to respond with sensitivity. Enhanced parental sensitive responding helps parents to better understand their child's behaviours and concerns and to support their teen in regulating emotions and behaviours. The emergence of this shared partnership with their children is essential for healthy autonomy. It is important to note that this approach to encourage the emergence of a shared partnership between parent and child does not preclude setting expectations, limits and consequences for problem behaviour. It is our belief that attention to these issues follow rather than precede attention to the child's needs for safe haven and secure base.

Previous evaluations of Connect have produced results that support the effectiveness of the program. Moretti and Obsuth (2009) reported significant reductions in parents' reports of teens' oppositional, aggressive, and antisocial behaviour, as well as decreases in anxiety and depression following completion of Connect. Parents also reported significant enhancements in their sense of parenting satisfaction and efficacy. Not only were these benefits superior to changes stemming from a waitlist condition, but also they were maintained at after one year of completing the program. These results have also been replicated (Moretti & Obsuth, 2009). In this study parents reported significant reductions in teens' externalizing and internalizing symptoms (with effect sizes in the small to medium range), reductions in teen-to-parent and parent-to-teen verbal and physical aggression (with moderate to large effect sizes), and enhancements in parenting satisfaction and effectiveness (with medium to large effect sizes). In addition, significant improvements in teens' social and school participation, as well as global functioning were found. Follow up at one year post-treatment showed good retention of these treatment benefits.

Two studies have also investigated the mechanisms of change behind Connect (Moretti, Obsuth, Craig, & Bartolo, 2015; Moretti, Obsuth, Mayseless, & Scharf, 2012). In both studies changes in the quality of the parent child attachment were associated with

decreases in children's internalizing and externalizing behaviours. Moretti and colleagues (2012) found that, in fact, increases in parent-child attachment security mediated reductions in child internalizing and externalizing problems. Moretti and colleagues (2015) provided some support to this finding through results that revealed that reductions in child attachment anxiety and attachment avoidance were associated with reductions in child internalizing and externalizing behaviours. In particular, they found that reductions in parental reports of children's attachment avoidance were associated with externalizing behaviours, while parental reports of children's attachment anxiety were associated with decreases in children's externalizing and internalizing behaviours. In addition to these findings, Moretti and colleagues (2015) also found that reductions in affect dysregulation were associated with decreases in levels of externalizing and internalizing behaviours in children.

The effectiveness of Connect has also been compared to that of other parenting interventions designed to reduced children's externalizing and internalizing behaviours (Stattin, Enebrink, Ozdemir, & Giannotta, 2015). Stattin and colleagues (2015) carried out a national evaluation of four parenting interventions implemented in Sweden. Connect was compared to three theoretically distinct parenting interventions: Comet (Kling, Forster, Sundell, & Melin, 2010), Incredible Years (Webster-Stratton, Reid, & Hammond, 2004), and Cope (Cunningham, 2006). These three programs are based on social learning theory and aim at enhancing children's social skills and affect regulation by (1) encouraging parents to use praise and incentives to increase children's cooperative behaviours, (2) ignoring children's inappropriate and disruptive behaviours, and (3) setting effective limits, routines, and positive discipline and rules. Results from this randomized study revealed that all four parenting interventions under study were effective in producing clinically meaningful reductions in child conduct problems and attention deficit hyperactivity disorder (ADHD) symptoms. Although effective, Connect yielded effect sizes of lower magnitude across some outcomes when compared to those of the other interventions. The authors suggested that these differences might be due to the relational nature of Connect: attachment-based interventions focus on enhancing security within the parent-child relationship as a foundation for building a sense of shared partnership within the parent-relationship and jointly resolving challenging

behaviours. As a result the benefits of this approach may become increasingly apparent over time.

## **2.3. Measures**

Caregivers completed a battery of tests at two times: prior to commencing the intervention (i.e., pre-treatment) and after completing the intervention (i.e., post-treatment). This battery of tests included caregiver reports on their teen's externalizing problems, internalizing problems, caregiver-child attachment, teen's level of aggression toward their parent(s), and affect regulation (i.e., youth outcomes). Caregivers also completed measures on their own affect regulation, level of aggression toward their child, and parenting efficacy and satisfaction (i.e., parental outcomes). The measures used are as follows:

### **2.3.1. The Brief Child and Family Phone Interview (BCFPI)**

The BCFPI is a standardized parent-report assessment that measures children's functioning in six domains: regulation of attention, cooperativeness, conduct problems, separation anxiety, anxiety/depression, and dysthymia (Cunningham, Boyle, Hong, Pettingill, & Bohaychuk, 2009). Scores on each domain range from 0 – never true – to 2 – often true. Based on these domains, the BCFPI generates three composite scores: total problems, externalizing problems, and internalizing problems. Additionally, the BCFPI also yields a composite score that assesses parental mood. In the present study, pre-treatment and post-treatment BCFPI scores of children's externalizing and internalizing problems were used. Pre-treatment and post-treatment scores of parental mood were also used. Higher scores on all three scores suggest higher levels of impairment. BCFPI scores are presented as T-scores, which are standardized measures based on a distribution with a mean of 50 and a standard deviation of 10. T-scores of 70 or above (two or more standard deviations above the mean), are considered to be in the clinical range (Cunningham, Pettingill, & Boyle, 2006).

Internal consistency reliability for the all BCFPI composite scores has been reported to range between .71 and .91 (Cunningham et al., 2009). In the present sample

standardized Cronbach's alpha was used to investigate the internal consistency of the BCFPI scores used in the study. The internal consistency reliability of the externalizing behaviours score derived from 18 of the BCFPI items was .87 at pre-treatment and .89 at post-treatment. The pre-treatment internal consistency reliability of the internalizing problems scale (composed of 18 items) was .88 while the post-treatment internal consistency was .89. Finally, BCFPI's parental mood scale (composed of six items) achieved a pre-treatment consistency of .83 and a post-treatment level of .84. All obtained Chronbach's alpha levels are considered to suggest a high level of internal consistency.

### **2.3.2. The Affect Regulation Checklist (ARC)**

The ARC is a 12-item self-report measure meant to assess emotion regulation (Moretti, 2003). ARC is based on a multidimensional view of emotion regulation that includes both maladaptive and adaptive aspects of regulation. The ARC yields three factors: Affect Dysregulation (4 items) Affect Suppression (5 items) and Adaptive Reflection (3 items). Items are scored on a 3-point scale ranging from "*Not like me*" to "*A lot like me*" and ask about experiences of affect in general. Internal consistency reliability for the ARC has been reported at .80 (Moretti, Obsuth, Craig, & Bartolo, in press). In the present study, the ARC was used as a self-report measure of caregivers' affect regulation. Additionally, a modified ARC was also used in the study in order to serve as a parental report of their child's affect regulation. In the present study, pre-treatment, and post-treatment scores for each of the three factors of the ARC were used as outcome measures for both parental and youth's affect regulation.

Internal consistency reliability for the ARC was investigated by calculating Chronbach's alpha. For the parental self-report ARC, the pre-treatment and post-treatment internal consistency levels of the affect dysregulation factor were .87 and .85, respectively. For the adaptive reflection factor in the self-report measure the internal consistency levels were .89 at pre-treatment and .88 at post-treatment. Finally, the affect suppression factor of the parental self-report ARC achieved internal consistencies of .78 at pre-treatment and .81 at post-treatment. Parental reports of their children affect dysregulation were highly consistent at .89 at pre-treatment and .90 at post-treatment.

Similar findings were found at pre-treatment (.91) and post-treatment (.92) for the internal consistency of the adaptive reflection factor of the parental report measure. Finally, pre-treatment internal consistency for the affect suppression factor of the parental report ARC was of .81 while the post-treatment level was .82. Overall, it is safe so say that in the present study both versions of the ARC used herein are highly internally consistent.

### **2.3.3. The Comprehensive Adolescent-Parent Attachment Inventory (CAPAI)**

The CAPAI is a 36-item measure of adolescent-parent attachment (Moretti, McKay, & Holland, 2000). Parents reported on their perception of their child's attachment to them by rating each statement on a 7-point scale ranging from 1 – “*Disagree strongly*” to 7 – “*Agree strongly*”. Two superordinate factors emerge from the CAPAI: attachment anxiety and attachment avoidance. In the present study, pre-treatment and post-treatment scores for each of the two factors of the CAPAI were used.

Previous research has reported the internal consistency reliability coefficient for the CAPAI to be .88 (Moretti et al., 2015). Similar internal consistency levels were obtained in the present study through the use of Chronbach's alpha. Namely, internal consistency reliability for CAPAI's attachment anxiety factor was .88 at pre-treatment and .86 at post-treatment. For the attachment avoidance factor the internal consistency reached .86 at pre-treatment and .82 at post-treatment. In all instances, the internal consistency reliability of the factors was high.

### **2.3.4. The Parenting Sense of Competence Scale (PSOC)**

The PSOC is a parent report that assesses parental satisfaction and sense of efficacy as a parent (Johnston & Mash, 1989). Parents respond to each question on a 6-point scale ranging from “strongly disagree” to “strongly agree”. The PSOC yields two subscale scores: parental satisfaction and parental efficacy. Previous investigations of the internal consistency of these two subscales yielded estimates of .84 and .81, respectively. As with all of the measures used in this study, caregivers completed the PSOC before and after completing Connect. Pre-treatment and post-treatment scores

for each of the two subscale scores of the PSOC were used in this study. Internal consistency reliability for the PSOC was high for the two factor of the scale. Namely, the parental satisfaction subscale achieved internal consistency levels of .76 at pre-treatment and .75 at post-treatment. Internal consistency for the parental efficacy subscale was .77 at pre-treatment and .72 at post-treatment.

### **2.3.5. The Conflict Tactics Scale (CTS)**

The CTS, a questionnaire meant to assess aggressive behaviour toward others (Straus, 1979), was modified to be used as a 10-item parent report that yields two subscale scores: youth aggression toward parents (5 items) and parents aggression toward youth (5-items). In previous studies the internal consistency reliability of the CTS has ranged from .70 to .80 (Moretti & Obsuth, 2009). In the present study similar levels of internal consistency reliability were achieved through the use of Chronbach's alpha. Explicitly, the subscale that assesses the level of youth's aggressive behaviour toward his/her parents a Chronbach's alpha of .88 and .88 were achieved at pre-treatment and post-treatment, respectively. For the CTS' subscale assessing level of parental aggression toward their child, the Chronbach's alpha was of .83 at pre-treatment and of .74 at post-treatment.

## **2.4. Missing Data Analysis**

Given the large amount of missing data present in the data files, a careful analysis of missing data was warranted. This analysis of missing data was carried out on the pre-treatment and post-treatment scale level for each outcome measure. The analysis of missing data on the 2,475 biological parents that participated in Connect identified that 1,472 cases (59.5%) had more than 30% of the outcome measures of interest missing. Given the large proportion of missingness in this sample of biological parents, all biological parents missing more than 30% of the outcomes of interests were dropped from subsequent analyses. Although no standard cut-offs have been established in the literature as to when missing data is too much missing data in a sample, published recommendations suggest that cases with more than 30% of the data missing have the potential of biasing subsequent results even after imputing missing

data (Dong & Peng, 2013). After excluding all biological parents that had more than 30% of the outcomes missing the sample size was reduced to 1,003 biological parents (40.53%% of original sample of biological parents). An additional exclusion criterion was applied to the sample at this point. Given the study's goal of understanding the effectiveness of parental participation in Connect, only biological parents that achieved completion status in the program were retained in the sample. Program completers were those that attended at least 7 of the 10 sessions of Connect. After this second exclusion criterion, the sample size was reduced to 926 biological parents. A final missing data analysis on the remaining 926 parents revealed 109 different patterns of missing data at the scale level of the outcomes measures. In fact, missing data was evident on each of the outcomes of interest (see Table 2.1). Complete data was collected from 278 (30.02%) biological parents. The remaining 648 (69.98%) biological parents failed to provide at least one of the outcome measures of interest in this study.

**Table 2.1. Missing data on treatment outcomes of interest.**

Measure and Imputed variable	Amount of Missing Data Across Participants	
	Pre-Treatment	Post-Treatment
<b>Youth Outcomes</b>		
BCFPI		
Externalizing Behaviours	415 (44.8%)	417 (45.0%)
Internalizing Problems	428 (46.2%)	421 (45.5%)
ARC		
Affect Dysregulation	11 (1.2%)	15 (1.6%)
Affect Suppression	39 (4.2%)	29 (3.1%)
Affect Reflection	47 (5.1%)	34 (3.7%)
CAPAI		
Attachment Anxiety	1 (0.1%)	9 (1.0%)
Attachment Avoidance	1 (0.1%)	9 (1.0%)
Conflict Tactics Scale		
Youth Aggression Toward Parents	12 (1.3%)	36 (3.9%)
<b>Parental Outcomes</b>		
BCFPI		
Parental Mood	251 (27.1%)	396 (42.8%)
PSOC		
Parental Satisfaction	1 (0.1%)	7 (0.8%)
Parental Efficacy	1 (0.1%)	7 (0.8%)
ARC		
Affect Dysregulation	5 (0.5%)	10 (1.1%)
Affect Suppression	7 (0.8%)	9 (1.0%)
Affect Reflection	12 (1.3%)	10 (1.1%)
Conflict Tactics Scale		
Parental Aggression Toward Youth	15 (1.6%)	39 (4.2%)



An Analysis of Variance (ANOVA) was performed to investigate the presence of demographic and pre-treatment outcome differences between the biological parents with complete data ( $n = 302$ ), those that missed between 1% and 30% of the outcome measures ( $n = 701$ ), and the previously excluded parents who missed to report more than 30% of the outcome measures ( $n = 1,472$ ). This analysis was carried out to investigate (1) whether the groups differed significantly from each other and (2) to identify whether excluding cases missing more than 30% of the outcome scores from the sample biased the nature of the sample. Results from these analyses revealed no significant differences among groups of parents in any of the continuous demographic variables (see Table 2.2). In contrast, significant group differences were found with regard to level of parental aggression toward their child and level of parental mood at pre-treatment. Namely, level of parental aggression toward youth as assessed by the CTS revealed a significant difference between the groups ( $F = (2, 1755) = 3.94, p = .020$ ) where parents who failed to provide between 1% and 30% of the data ( $M = 1.39, SD = .39$ ) reported significantly more aggression toward their child than those parents that provided a complete set of data ( $M = 1.32, SD = .35$ ). The mean difference between these two groups was .07 ( $SE = .25; p = .024$ ). Similarly, levels of parental mood as assessed by the BCFPI significantly vary across groups (Welch's  $F = (2, 746.01) = 6.36, p = .002$ )<sup>1</sup>. Games-Howell post hoc tests revealed that those parents that provided less than 30% of the data reported significantly lower mood levels ( $M = 60.29, SD = 14.41$ ) than parents that provided complete data ( $M = 56.81, SD = 12.19$ ). The mean difference between these groups of parents was 2.48 ( $SE = .98; p < .001$ ).

<sup>1</sup> Levene's test of homogeneity of variance was significant ( $p = .002$ ). Given this violation of the assumption of homogeneity of variances, the Welch's F test was utilized to compare levels of parental mood between groups. Games-Howell post hoc tests were then performed to also account for the violation of the assumption of homogeneity of variances.

**Table 2.2. Demographics, pre-treatment outcome levels, and results of tests of group association.**

<b>Variable<sup>a</sup></b>	<b>Provided Complete Data (N = 302)</b>	<b>Missing 1% - 30% (N = 701)</b>	<b>Missing More than 30% (N = 1,472)</b>	<b>F-Statistic</b>
Parent's Age	43.63 (7.01)	43.50 (7.06)	42.71 (6.98)	.055
Youth's Age	14.01 (2.75)	13.94 (2.69)	13.88 (2.61)	.742
Number of children parented	2.14 (1.04)	2.11 (0.98)	2.14 (1.06)	.886
Youth's Grade in School	8.10 (2.49)	8.01 (2.49)	8.13 (2.30)	.705
<b>Youth Outcomes</b>				
Externalizing Behaviors	71.22 (12.63)	72.78 (12.69)	71.68 (13.11)	.348
Internalizing Problems	64.27 (14.49)	63.99 (14.42)	65.65 (14.53)	.319
Affect Dysregulation	3.57 (1.13)	3.57 (1.09)	3.56 (1.09)	.964
Affect Suppression	2.84 (.99)	2.83 (.96)	2.85 (.99)	.897
Affect Reflection	2.29 (.93)	2.31 (.98)	2.40 (1.00)	.131
Attachment Anxiety	3.26 (1.12)	3.22 (1.05)	3.35 (1.13)	.060
Attachment Avoidance	3.41 (1.31)	3.33 (1.25)	3.41 (1.25)	.407
Youth Aggression Toward Parents	1.74 (.67)	1.81 (.70)	1.79 (.69)	.322
<b>Parental Outcomes</b>				
Parental Mood	56.81 (12.19)	58.26 (13.10)	60.29 (14.41)	.002**
Parental Satisfaction	3.67 (.78)	3.59 (.79)	3.60 (.79)	.381
Parental Efficacy	3.51 (.84)	3.43 (.84)	3.44 (.86)	.432
Affect Dysregulation	2.62 (.99)	2.62 (.99)	2.61 (.99)	.999
Affect Suppression	2.42 (.88)	2.33 (.85)	2.40 (.92)	.249
Affect Reflection	3.55 (.99)	3.62 (1.00)	3.64 (1.01)	.433
Parental Aggression Toward Youth	1.32 (.35)	1.38 (.39)	1.36 (.37)	.020*

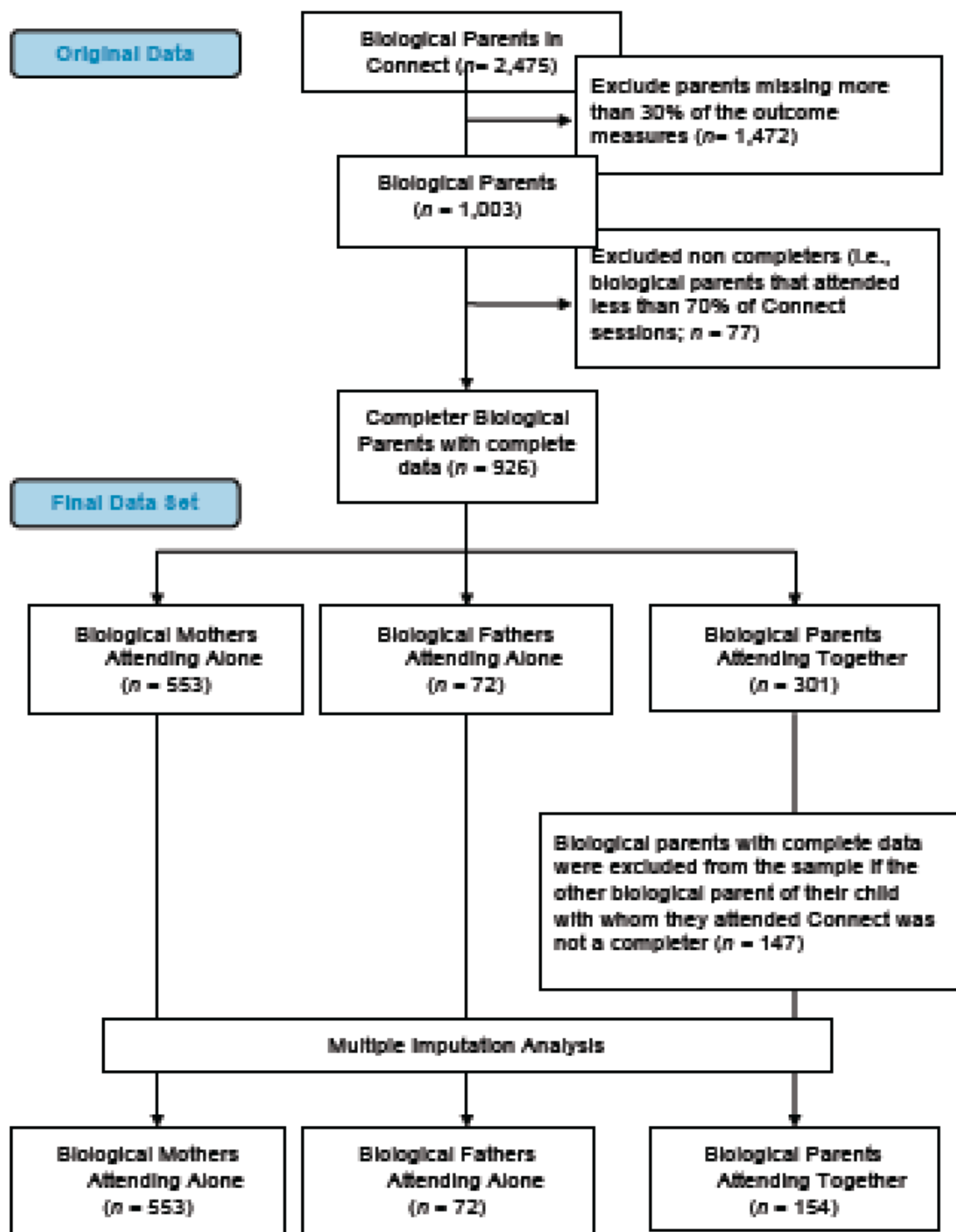
Chi-square tests for associations were also carried out in order to investigate if categorical demographic variables were statistically independent for those parents who provided complete data; parents with 1% and 30% of the data missing; and parents with more than 30% of the data missing. Results from these analyses revealed that groups did not differ with respect to youth's gender ( $\chi^2 (2) = 5.55, p = 1.18$ ), parent's ethnicity ( $\chi^2 (6) = 5.48, p = .48$ ), youth's ethnicity ( $\chi^2 (6) = 5.81, p = .46$ ), or parental level of education ( $\chi^2 (10) = 10.18, p = .43$ ). In contrast, groups differed significantly in family configuration ( $\chi^2 (4) = 12.33, p = .015$ ), and gross annual family income ( $\chi^2 (6) = 28.10, p < .001$ ). Standardized residual scores were calculated to investigate how parental groups differed in terms of family configuration and gross annual family income. In regard to family configuration, one-parent families were underrepresented in the group of participants that failed to report between 1% and 30% of their data ( $n = 273, p < .001$ ). Complementing this finding, two-parent families were overrepresented in this same group of parents ( $n = 334, p < .001$ ). In regard to family configuration, an annual gross family income of less than C\$25,000 was overrepresented ( $n = 178, p < .001$ ) while an income between C\$50,000 and C\$75,000 was underrepresented ( $n = 56, p < .001$ ) for those parents failing to report more than 30% of their data. In contrast, an annual gross family income between C\$50,000 and \$75,000 was overrepresented ( $n = 78, p < .003$ ) while an income of less than C\$25,000 was underrepresented ( $n = 87, p < .001$ ) for those parents failing to provide between 1% and 30% of their data. It is important to note that the level of significance for the above reported residual scores was adjusted using the Bonferroni method in order to control of a possible inflation of type I error stemming from performing multiple comparisons.

## **2.5. Final Study Sample**

Of the 926 biological parents retained after all exclusions, 553 (59.7%) were biological mothers attending Connect alone, 72 (7.8%) were biological fathers attending the program by themselves, and 301 (11.0%) were either biological mothers or fathers attending the program along with their child's other biological parent. Given my interest in understanding the effect of co-attendance to parenting interventions by biological parents, only couples of biological parents for which both parents attended 70% or more

of the sessions were included in the analyses (i.e., biological parents with complete data were excluded from the sample if the other biological parent of their child with whom they attended Connect with did not complete 70% or more of the sessions). After imposing this final limitation in our data, 154 biological parents (a total of 77 couples of biological parents where both mother and father attended together) were retained in the sample along with the already reported 553 biological mothers and 72 fathers that attended Connect alone (See Figure 1). In the final sample used in the analyses to follow, 779 biological parents represented 702 children. A slightly higher percent of the children were male (461 male, 49.8%; 384 female, 41.5%). Most parents identified their children's ethnicity as Caucasian ( $n = 341$ , 43.8%), followed by Aboriginal ( $n = 62$ , 8.0%), Asian ( $n = 53$ , 6.8%), and other ( $n = 18$ , 2.3%) At the start of the program the average youth's age was of 13.85 (SD = 2.67. A complete description of the sample used in the analyses is provided in the results section.

Figure 1. Flow diagram of data selection and exclusion



## **2.6. Multiple Imputation Analysis**

Due to the high amount of missing data for some of the outcome measures, multiple imputation (MI) was employed in order to account for missing data. This procedure was used on the final sample of participants ( $n = 779$ ). The MI procedure was only carried out on the outcome variables (i.e., missing data on demographic variables was not imputed). The Markov Chain Monte Carlo (MCMC) algorithm known as Fully Conditional Specification was used to carry out the MI analysis. This algorithm imputes incomplete data points one at a time and, subsequently, uses the imputed data point along with the observed data as predictors in the imputation of other missing points. Multivariate normality, an assumption of the MCMC algorithm used for the MI analysis, was assessed and confirmed for the variables of interest. Normality for these variables was confirmed through visual examination of Q-Q plots. Similarly, the MI analysis was performed under the assumption that the missing data was missing at random given that no evidence to the contrary could be found (i.e., patterns of missing data appear random and all values of outcome measures appeared to be represented in the distribution of each variable).

The Statistical Package for the Social Sciences (SPSS-21) was used to carry out the MI analysis. Pre-treatment and post-treatment item-level data corresponding to each of the parental and youth's outcomes of interest were used in the imputation analysis. The use of item-level data to predict missing values is consistent with recent recommendations from the literature (Gottschall, West, & Enders, 2012). A total of 40 fully imputed data sets were created. After the MI analyses, complete data from the 779 biological parents was obtained. The mean and sample size of the observed and imputed data for both pre-treatment and post-treatment values of the imputed variables is presented in Table 2.3.

**Table 2.3. Pre-treatment and post-treatment observed and imputed data**

Measure and Imputed variable	Pre-Treatment				Post-Treatment			
	Observed		Imputed		Observed		Imputed	
	N	Mean	N	Mean	N	Mean	N	Mean
<b>Youth Outcomes</b>								
Externalizing Behaviors	438	71.93	779	69.92	434	66.65	779	68.01
Internalizing Problems	427	64.46	779	66.01	430	61.54	779	61.01
Affect Dysregulation	772	3.56	779	3.57	766	3.13	779	3.14
Affect Suppression	744	2.85	779	2.85	756	2.68	779	2.68
Affect Reflection	739	2.32	779	2.33	751	2.60	779	2.60
Attachment Anxiety	778	3.27	779	3.27	770	3.15	779	3.17
Attachment Avoidance	778	3.32	779	3.33	770	3.08	779	3.08
Youth Aggression Toward Parents	769	1.80	779	1.81	746	1.56	779	1.57
<b>Parental Outcomes</b>								
Parental Mood	574	57.80	779	63.80	458	54.06	779	55.92
Parental Satisfaction	778	3.62	779	3.62	772	3.90	779	3.90
Parental Efficacy	778	3.47	779	3.47	772	3.81	779	3.81
Affect Dysregulation	775	2.61	779	2.61	771	2.30	779	2.31
Affect Suppression	773	2.37	779	2.37	771	2.28	779	2.28
Affect Reflection	770	3.61	779	3.60	770	3.76	779	3.76
Parental Aggression Toward Youth	767	1.37	779	1.38	743	1.19	779	1.30

## **2.7. Data Analytic Method**

The collected data was first analyzed to unearth any significant between group differences. To do this, ANOVA tests and Chi-square tests of association were carried out to investigate group differences for continuous and categorical demographic variables and pre-treatment outcomes scores, respectively. Following these analyses, the data analytic method was guided by the two research questions asked in this study as follows:

### **2.7.1. Is Connect Effective for Biological Parents?**

To examine this research question paired-sample t-tests were run for each outcome of interest. These analyses were independently conducted for each group of biological parents under investigation (i.e., biological mothers attending alone, biological fathers attending alone, biological mothers attending with the biological father of their child, and biological father attending Connect with the biological mother of their child). Biological parents attending Connect together were analyzed independently of each other based on their gender. Splitting this group of parents in this manner allowed for conclusions to be made on the effect of parental gender and co-participation in the intervention.

Given that the total number of proposed paired-sample t-tests was large (i.e., 15 for each group of parents) it was necessary to use a method to adjust the significance level of the analyses. This adjustment was warranted due to the increased probability of committing a type I error due to multiple comparisons. For this research question the Bonferroni method was used to adjust significance levels in all analyses (Dunn, 1961).

### **2.7.2. Is Connect Differentially Effective Across All Groups of Biological Parents?**

Analysis of Covariance (ANCOVA) were performed in order to investigate if there are significant differences between post-treatment scores on the outcomes of interest across all groups of parents while controlling for pre-treatment scores (i.e., pre-treatment scores were used as covariates). Post-hoc tests were performed only after the ANCOVA



test showed to be significant. These post-hoc tests investigate which group significantly differ from each other for each outcome. ANCOVA and any necessary post hoc group comparisons were carried out between biological mothers attending Connect alone, biological fathers attending the program alone, and biological mothers and fathers attending together.

As was the case for the first research question, significant post hoc pairwise group comparisons needed to be carefully interpreted only after performing significance level adjustment for inflated type I error. Bonferroni corrections were used to account for multiple comparisons and to adjust significance levels accordingly.

### **2.7.3. Intent-to-treat Analysis**

Completers' only data is reported in the results section. Nonetheless, intent-to-treat analyses were carried out and discrepancies between completers' only and intent-to-treat analyses are reported where present. The intent-to-treat analyses were run on biological parents who were previously excluded for not attending more than 70% of the program's sessions (i.e., did not achieved completer status) as well as those that achieved completer status ( $n = 1,003$ ).

## Chapter 3.

### Results

#### 3.1. Descriptive Data.

The average parental age across groups of biological parents was of 43.32 years ( $SD = 7.02$ ). Most participating parents were female ( $n = 630$ , 80.9%; male:  $n = 149$ , 19.1%) and most self-identified as Caucasian ( $n = 410$ , 52.6%). The mean number of children parented by the biological parents participating in the study was of 2.09 ( $SD = .98$ ). The majority of parents reported holding a university or college degree ( $n = 364$ ; 46.7%). In addition, the average age of the youth represented by their parents was of 13.85 years ( $SD = 2.67$ ) and most of the children were reported to be male ( $n = 387$ , 49.7%; female:  $n = 316$ , 40.6%). Parent's report of their child ethnicity revealed that most youth were Caucasian in ethnicity ( $n = 341$ ; 43.8%). Youth's mean grade level in school was 7.94 ( $SD = 2.48$ ). In regard to family demographics, one-parented families were represented the most in the sample ( $n = 370$ ; 47.5%) followed by two-parented families ( $n = 294$ ; 37.7%). An annual gross family income below C\$25,000 was represented the most in the sample ( $n = 134$ , 17.2%), closely followed by an annual family income between C\$25,000 and C\$50,000 ( $n = 131$ , 16.8%), between C\$50,000 and C\$75,000 ( $n = 101$ , 13.0%), and higher than C\$75,000 ( $n = 85$ ; 10.9%).

##### 3.1.1. Demographic Differences Between Groups.

ANOVA tests were carried out to investigate if biological mothers attending alone, biological fathers attending alone, or biological mothers and fathers attending together differed from each other on the basis of the collected continuous demographic variables. Significant between-group differences were only found for parental age ( $F(3, 687) = 19.27$ ,  $p < .001$ , see table 3.1). Tukey-Kramer method for post-hoc comparisons

was used in order to account for the effect of unequal sample size between the groups of parents being compared. These post-hoc tests revealed that biological mothers attending Connect alone were significantly and consistently younger ( $M = 42.17$ ,  $SD = 6.74$ ) than biological mothers attending together with the biological father of their child ( $M = 45.18$ ,  $SD = 6.09$ ;  $p = .004$ ), as well as to biological fathers whether attending alone ( $M = 46.02$ ,  $SD = 7.68$ ;  $p < .001$ ) or with the biological mother of their child ( $M = 47.87$ ,  $SD = 6.52$ ;  $p < .001$ ).

**Table 3.1 Group differences among groups of biological parents.**

Variable	Attending Alone		Attending Together		Significance Level
	Mothers	Fathers	Mothers	Fathers	
Parent's Age <sup>a</sup>	42.17 (6.73)	46.02 (7.61)	45.18 (6.05)	47.87 (6.47)	.000 <sup>c***</sup>
Parent's Ethnicity <sup>b</sup>					
Caucasian	295 (53.3%)	41 (66.6%)	40 (51.9)	35 (45.5%)	
Aboriginal	44 (8.0%)	4 (5.6%)	2 (2.6%)	3 (3.95)	
Asian	34 (6.1%)	3 (4.2%)	5 (6.5%)	5 (5.2%)	
Parent's Level of Education <sup>b</sup>					
Elementary	37 (6.7%)	13 (18.1%)	7 (9.1%)	8 (10.4%)	
High School	173 (31.3%)	20 (27.8%)	21 (27.3%)	16 (19.5%)	
College/University	265 (47.9%)	25 (34.7%)	37 (48.1%)	37 (48.1%)	
Graduate Degree	20 (3.6%)	5 (6.9%)	4 (5.2%)	3 (3.9%)	
Number of children parented <sup>a</sup>	2.09 (0.96)	1.99 (0.98)	2.17 (1.09)	2.00 (0.0)	.745 <sup>c</sup>
Youth's Gender <sup>b</sup>					
Female	250 (45.2%)	24 (33.3%)	40 (51.95)		
Male	303 (54.8%)	492 (66.7%)	35 (45.5%)		
Youth's Ethnicity <sup>b</sup>					
Caucasian	268 (48.5%)	35 (48.6%)	36 (46.8%)		
Aboriginal	53 (9.6%)	5 (6.9%)	4 (5.2%)		
Asian	40 (7.2%)	7 (9.7%)	6 (7.8%)		
Youth's Grade in School <sup>a</sup>	7.87 (2.51)	7.71 (2.19)	8.56 (2.38)		.192 <sup>c</sup>
Family Configuration <sup>b</sup>					
One-parent	319 (57.7%)	46 (63.9%)	2 (2.6%)	3 (3.9%)	
Two-Parent	200 (36.2%)	19 (26.4%)	72 (93.5%)	3 (3.9%)	
Blended	15 (2.7%)	6 (8.3%)	0 (0%)	0 (0%)	
Family Income <sup>b</sup>					
Below C\$25,000	124 (22.4%)	5 (6.9%)	5 (6.5%)	0 (0%)	
C\$25,000 - C\$50,000	105 (19.05%)	17 (23.6%)	8 (10.4%)	1 (1.3%)	
C\$50,000 - C\$75,000	71 (12.8%)	18 (25.0%)	11 (14.3%)	1 (1.3%)	
Above C\$75,000	56 (10.1%)	6 (8.3%)	21 (27.3%)	2 (2.6%)	

<sup>a</sup> Mean(Standard Deviation) provided for variable. <sup>b</sup> Number of participants(Percent) provided for variable.

<sup>c</sup> F-statistic. <sup>d</sup> Chi Square Statistic

Group differences among parents were also investigated for the categorical demographic variables. Results from these analyses revealed that groups were not significantly different on parental ethnicity ( $\chi^2 (9) = 8.76, p = .46$ ), youth's ethnicity ( $\chi^2 (9) = 5.45, p = .79$ ), and youth's age ( $\chi^2 (3) = 6.64, p = .08$ ). In contrast, groups differed in parental highest level of education ( $\chi^2 (15) = 25.20, p = .05$ ), family configuration ( $\chi^2 (6) = 109.23, p < .001$ ), and family income ( $\chi^2 (9) = 48.07, p < .001$ ).

Standardized residual scores were calculated to investigate how parental groups differed in terms of family income, family configuration, and parental level of education. In regard to family income, an annual family income below C\$25,000 was overrepresented for biological mothers attending Connect alone ( $n = 124, p < .001$ ). An annual family income of more than C\$75,000 was underrepresented in this same group of parents ( $n = 56, p < .001$ ). In contrast, an annual family income of more than C\$75,000 was overrepresented in the group of biological mothers attending Connect with the biological father of their child ( $n = 21, p < .001$ ). Finally, an annual family income below C\$25,000 was underrepresented for biological fathers attending the intervention alone ( $n = 5, p < .003$ ). In regard to family configuration, two-parent households were underrepresented for biological mothers ( $n = 200, p < .001$ ) and fathers ( $n = 19, p < .003$ ) attending alone. This same type of family configuration was overrepresented for biological mothers attending the intervention with the biological father of their child ( $n = 72, p < .001$ ). Lastly, and in regard to parental level of education, reports of receiving only some high school education were overrepresented for biological fathers attending Connect alone ( $n = 13, p < .001$ ). As before, the significance levels of these findings were adjusted by implementing the Bonferroni method.

### **3.1.2. Group Differences on Pre-treatment Scores**

ANOVA tests were also used to investigate if the group of parents under investigation differed on the basis of their pre-treatment scores. The assumption of normality for each group of parents as well as the presence of outlier was assessed by the Shapiro-Wilk test and boxplots, respectively. Results from these investigations indicated the distribution of all group of parents under study did not deviate significantly from normality ( $p < .05$ ) and that, although 6 cases were found to exceed 1.5 standard

deviations from the edge of the box in the boxplots created, the presence of outliers did not alter the results of the analyses. Because of this last finding, outliers were retained in the ANOVA tests performed. The assumption of homogeneity of variances was also met for all groups as indicated by Levene's Test of Homogeneity of Variances.

After performing the ANOVA tests, only two of the fifteen pre-treatment outcomes under investigation appeared to significantly differ between groups of biological parents (see table 3.2). Namely, parental reports of youth's avoidance attachment ( $F(3, 775) = 6.32, p < .001$ ) and parental level of adaptive emotional reflection ( $F(3, 775) = 11.79, p < .001$ ) significantly differed between groups. In regard to parental reports of youth's avoidance attachment, biological mothers attending Connect with the biological father of their child reported the lowest level of youth's attachment avoidance of all groups ( $M = 3.23, SD = 1.20$ ), followed by biological mothers attending the program alone ( $M = 3.25, SD = 1.26$ ), biological fathers attending alone ( $M = 3.38, SD = 1.15$ ), and biological fathers attending the program along the biological mother of their child ( $M = 3.89, SD = 1.18$ ). Tukey-Kramer post hoc analyses revealed that the mean difference between biological fathers attending the program with the biological mother of their child and biological mothers attending Connect alone (.65, 95% CI [.26, 1.03]) was statistically significant ( $p < .001$ ).

In regard to parental level of adaptive emotional reflection, biological fathers attending Connect with the biological mother of their child scored the lowest in this variable ( $M = 3.04, SD = .86$ ), followed by biological fathers attending Connect alone ( $M = 3.39, SD = 1.12$ ), biological mothers attending Connect together with the biological father of their child ( $M = 3.69, SD = .92$ ), and biological mothers attending alone ( $M = 3.70, SD = .96$ ). Tukey-Kramer post hoc tests indicated that significant mean differences for parental level of adaptive emotional reflection were present between biological mothers attending alone and biological fathers attending Connect along with the biological mother of their child (.66, 95% CI [.35, .96],  $p < .001$ ) and between biological mothers attending the program along with the biological father of their child and biological fathers attending Connect along with the biological mother of their child (.66, 95% CI [.24, 1.05],  $p < .001$ ).

**Table 3.2 Group differences at pre-treatment.**

Variable	Attending Alone		Attending Together		F-Statistic
	Mothers	Fathers	Mothers	Fathers	
<b>Youth Outcomes</b>					
BCFPI					
Externalizing Behaviours	72.32 (11.44)	71.03 (12.03)	72.96 (12.03)	72.55 (11.72)	.59
Internalizing Problems	65.91 (12.66)	64.16 (11.18)	64.54 (11.35)	64.78 (10.40)	.46
ARC					
Affect Dysregulation	3.56 (1.11)	3.25 (1.21)	3.72 (1.07)	3.69 (.96)	.14
Affect Suppression	2.84 (.98)	2.79 (.83)	2.92 (.93)	2.94 (.83)	.66
Affect Reflection	2.32 (.99)	2.39 (.99)	2.29 (.86)	2.41 (.81)	.76
CAPAI					
Attachment Anxiety	3.33 (1.13)	3.20 (1.07)	3.21 (1.02)	3.25 (.87)	.12
Attachment Avoidance	3.25 (1.26)	3.38 (1.15)	3.23 (1.20)	3.89 (1.18)	< .001***
Conflict Tactics Scale					
Youth Aggression Toward Parents	1.83 (.72)	1.79 (.66)	1.89 (.72)	1.81 (.72)	.16
<b>Parental Outcomes</b>					
BCFPI					
Parental Mood	61.32 (14.39)	57.75 (13.61)	60.07 (13.53)	56.94 (13.15)	.09
PSOC					
Parental Satisfaction	3.60 (.77)	3.78 (.91)	3.52 (.72)	3.67 (.76)	.17
Parental Efficacy	3.51 (.85)	3.50 (.80)	3.23 (.82)	3.228 (.82)	.06
ARC					
Affect Dysregulation	2.64 (.98)	2.35 (.97)	2.67 (.98)	2.56 (1.04)	.11
Affect Suppression	2.33 (.85)	2.49 (.99)	2.62 (.78)	2.37 (.85)	.08
Affect Reflection	3.70 (.96)	3.39 (1.12)	3.69 (.92)	3.04 (.86)	< .001***
Conflict Tactics Scale					
Parental Aggression Toward Youth	1.38 (.38)	1.31 (.36)	1.40 (.41)	1.39 (.39)	.38

Note. Mean(Standard Deviation) provided for variables.

### **3.2. Is Connect Effective for Biological Parents?**

Prior to conducting the planned paired-samples t-tests analyses, the outcomes of interest were examined to ensure congruence with the assumptions of the tests for each of the parent groups under investigation. Normality of the distribution of the differences of the dependent variable between the groups being compared was visually assessed through the use of Q-Q plots. No meaningful deviations from normality were found therefore meeting the assumption of normality. The presence of outliers was also visually investigated via the use of boxplots. Cases 1.5 box-lengths from the edge of the box in the boxplots were considered to be outliers. Following this rule, outliers were found in the difference between post-treatment and pre-treatment for externalizing behaviours, internalizing problems, and parental mood. Planned paired-samples t-tests were run with and without the outliers to assess their significance. The exclusion of the outliers from the analyses did not alter the results. Because of these findings, outliers were retained and included in the analyses. The results from the paired-samples t-test are presented and organized below by parental group. Cohen's effect sizes ( $d$ ) are provided in brackets for each test in table 3.3.



**Table 3.3 Mean pre-post differences and effect sizes for all outcomes.**

Variable	Attending Alone		Attending Together	
	Mothers	Fathers	Mothers	Fathers
<b>Youth Outcomes</b>				
BCFPI				
Externalizing Behaviours	4.68 (.48) **	-4.31 (.41)	5.12 (.61)	4.79 (.53)
Internalizing Problems	3.89 (.35) **	.376 (.42)	3.71 (.34)	3.48 (.39)
ARC				
Affect Dysregulation	0.41 (.42) ***	.42 (.46) ***	.47 (.52) ***	.49 (.53) ***
Affect Suppression	0.15 (.17) ***	-.007 (.01)	.18 (.19)	.38 (.41) ***
Affect Reflection	-0.27 (.26) ***	-.25 (.26)	-.44 (.44) ***	-.18 (.19)
CAPAI				
Attachment Anxiety	0.14 (.18) ***	-.11 (.13)	.18 (.33) *	.04 (.08)
Attachment Avoidance	0.22 (.28) ***	.21 (.26)	.26 (.34) *	.36 (.48) ***
Conflict Tactics Scale				
Youth Aggression Toward Parents	0.24 (.47) ***	.16 (.42) *	.28 (.50) ***	.18 (.41) **
<b>Parental Outcomes</b>				
BCFPI				
Parental Mood	2.78 (.23)	3.28 (.29)	1.69 (.16)	2.58 (.23)
PSOC				
Parental Satisfaction	-0.29 (.48) ***	-.24 (.35) *	-.33 (.48) ***	-.16 (.28) *
Parental Efficacy	-0.35 (.49) ***	-.29 (.42) ***	-.43 (.53) ***	-.20 (.35) **
ARC				
Affect Dysregulation	0.31 (.36) ***	.31 (.37) *	.33 (.48) ***	.29 (.20) **
Affect Suppression	0.07(.10)	.07 (.08)	.18 (.24)	.09 (.13)
Affect Reflection	-0.12 (.15) ***	-.23 (.21)	-.18 (.21)	-.28 (.36) ***
Conflict Tactics Scale				
Parental Aggression Toward Youth	0.18 (.57) ***	.13 (.47) ***	.22 (.59) ***	.18 (.61) ***

Note. Data provided in Mean Difference (Cohen's *d*). Significance levels indicated as follows: \* .05; \*\*.01; \*\*\* .001

### 3.2.1. Biological Mothers Attending Connect Alone

#### *Youth Outcomes*

Paired-samples t-test analyses performed on all maternal reports of youth's emotional and behavioural outcomes revealed consistent and statistically significant mean pre-post differences for most outcomes. More specifically, significant mean pre-post differences were found for maternal reports of children's externalizing behaviours (4.68, 95% CI [9.30, .95];  $t(42) = 2.04, p < .003, d = .48$ ), where post-treatment level of externalizing behaviours were lower ( $M = 67.64, SD = 11.61$ ) than pre-treatment levels of the same outcome ( $M = 72.31, SD = 11.44$ ). A mean pre-post difference was also found for internalizing problems where post-treatment levels of internalizing problems were significantly lower ( $M = 65.91, SD = 12.66$ ) than pre-treatment levels ( $M = 62.01, SD = 11.71$ ). This was a significant mean decrease from pre-treatment to post-treatment (3.89, 95% CI [7.39, .40],  $t(44) = 2.25, p = .003, d = .35$ ).

Significant mean differences were also found between the three subscales of the ARC. Maternal reports on the level of youth's affective dysregulation were significantly lower at post-treatment ( $M = 3.14, SD = 1.13$ ) compared to the levels reported at pre-treatment ( $M = 3.56, SD = 1.11$ ). The mean difference was of .41 (95% CI [.49, .33],  $t(277,044) = 9.89, p < .001, d = .42$ ). A significant mean pre-post mean difference was also found for maternal reports of affective suppression (.15, 95% CI [.23, .08];  $t(72,821) = 4.01, p < .001, d = .17$ ) where post-treatment levels of affective suppression were lower ( $M = 2.69, SD = .97$ ) compared to the pre-treatment level of this variable ( $M = 2.84, SD = .98$ ). Maternal reports on the level of youth's adaptive affective reflection also revealed a significant yet positive mean pre-post difference (-.27, 95% CI [-.18, -.35];  $t(21,181) = -6.13, p < .001, d = .28$ ) with higher post-treatment levels of adaptive affective reflection ( $M = 2.59, SD = .1.00$ ) compared to the obtained pre-treatment levels of this same variable ( $M = 2.32, SD = .99$ ).

In terms of quality of the adolescent-mother attachment, biological mothers attending Connect alone reported significant mean differences for both anxious attachment (.14, 95% CI [1.99, .07];  $t(1,030,773) = 4.23, p < .001, d = .18$ ) and avoidant attachment (.22, 95% CI [.28, .15];  $t(1,218,200) = 6.64, p < .001, d = .28$ ). For anxious

attachment, maternal reports indicated that the level of anxious attachment decreased from pre-treatment ( $M = 3.33$ ,  $SD = .1.13$ ) to post-treatment ( $M = 3.20$ ,  $SD = .1.10$ ). Similar results were obtained from maternal reports of avoidant attachment with higher pre-treatment levels of avoidant attachment ( $M = 3.25$ ,  $SD = .1.26$ ) compared to post-treatment levels of this same variable ( $M = 3.03$ ,  $SD = 1.23$ ).

Finally, biological mothers attending Connect alone reported that the mean level of aggression initiated by their child and directed at them was lower at post-treatment ( $M = 1.59$ ,  $SD = .65$ ) than at pre-treatment ( $M = 1.83$ ,  $SD = .72$ ). This mean decreased in child-parent aggression was significant (.24, 95% CI [.29, .20];  $t(49,332) = 10.65$ ,  $p < .001$ ) with a small to medium effect size of .47.

### **Parental Outcomes**

Significant pre-post mean differences were found in five of the seven parental outcomes investigated. Namely, mothers attending alone reported that their level of parental satisfaction was higher at post-treatment ( $M = 3.90$ ,  $SD = .78$ ) than at pre-treatment ( $M = 3.60$ ,  $SD = .77$ ). The mean difference was of -.30 (95% CI [-.25, -.35];  $t(570,210) = 11.43$ ,  $p < .001$ ,  $d = .49$ ). Similarly, biological mothers attending alone reported higher levels of parental efficacy at post-treatment ( $M = 3.86$ ,  $SD = .81$ ) than at pre-treatment ( $M = 3.51$ ,  $SD = .85$ ). This significant mean change achieved small to medium effect size of .49 (-.36, 95% CI [-.29, -.41];  $t(160,631) = 11.78$ ,  $p < .001$ ). A significant mean difference was also found between pre- and post-treatment assessments of parental level of affective dysregulation and adaptive affective reflection. For parental affective dysregulation, post-treatment levels ( $M = 2.64$ ,  $SD = .86$ ) were significantly lower than pre-treatment levels ( $M = 2.64$ ,  $SD = .98$ ) with an medium effect size of .37 (.30, 95% CI [.38, .24];  $t(591,748) = 8.43$ ,  $p < .001$ ). Post-treatment levels of adaptive affective reflection, on the other hand, were higher ( $M = 3.82$ ,  $SD = .86$ ) than pre-treatment levels of this same variable ( $M = 3.70$ ,  $SD = .96$ ). The effect size for this change was small .15 (-.13, 95% CI [-.20, -.06];  $t(118,149) = 3.54$ ,  $p < .001$ ). Finally, a significant mean pre-post difference was also found between the post-treatment ( $M = 1.20$ ,  $SD = .27$ ) and pre-treatment ( $M = 1.38$ ,  $SD = .39$ ) levels of parent-child aggression

initiated by the mother. This mean difference achieved a medium effect size of .57 (.18, 95% CI [.15, .21],  $t(161,246) = 12.90, p < .001$ ).

Contrary to the above findings, two parental outcomes did not yield significant mean pre-post differences. These included maternal ratings of their own mood from pre- to post-treatment ( $t(44) = -1.19, p = .24$ ) and maternal ratings of their levels of affective suppression from pre- to post-treatment ( $t(211,664) = -2.26, p = .059$ ).

### **3.2.2. Biological Fathers Attending Connect Alone**

#### ***Youth Outcomes.***

The mean difference between pre- and post-treatment reports of youth's outcomes was only significant for two of the eight youth outcomes assessed. In particular, biological fathers attending Connect alone reported lower levels of youth's affect dysregulation at post-treatment ( $M = 3.83, SD = 1.16$ ) compared to the reports on this same outcome at pre-treatment ( $M = 3.25, SD = 1.21$ ). As mentioned above, the pre-post mean differences was significant (.42, 95% CI [.19, .64];  $t(111,920) = 3.67, p < .001$ ) with a small to medium effect size of .46. A significant pre-post difference was also obtained from paternal reports of aggression initiated by their children and directed at them (.16, 95% CI [.06, .26];  $t(24,408) = 3.21, p = .012; d = .42$ ). In this case, post-treatment reports on this variable were significantly lower ( $M = 1.48, SD = .58$ ) compared to pre-treatment levels of aggression ( $M = 1.64, SD = .66$ ).

Significant pre-post differences were not found for the following youth outcomes as reported by fathers attending Connect alone: externalizing problems ( $t(66) = 1.63, p = .11$ ); internalizing problems ( $t(73) = 1.84, p = .07$ ), affective suppression ( $t(158,711) = .078, p = .96$ ); affective reflection ( $t(404,629) = -2.24, p = .03$ ); anxious attachment ( $t(562,450) = 1.14, p = .25$ ); and avoidant attachment ( $t(465,657) = 2.17, p = .03$ ).

### ***Parental Outcomes.***

Fathers attending connect alone reported higher levels of parental satisfaction at post-treatment ( $M = 4.00$ ,  $SD = .88$ ) than at pre-treatment ( $M = 3.78$ ,  $SD = .91$ ). The mean difference between these pre-post reports achieved significance ( $-24$ , 95% CI  $[-.07, -.40]$ ;  $t(398,553) = 2.91$ ,  $p = .04$ ) with a small to medium effect size ( $d = .35$ ). Similarly, fathers attending alone also reported higher levels of parental efficacy at post-treatment ( $M = 3.79$ ,  $SD = .79$ ) than at pre-treatment ( $M = 3.50$ ,  $SD = .80$ ). The mean difference between these two time points was significant ( $-.29$ , 95% CI  $[-.13, .44]$ ;  $t(293,086) = 3.51$ ,  $p < .001$ ) with a small to medium effect size ( $d = .42$ ). A significant mean difference was also present for parental level of affect dysregulation ( $.31$ , 95% CI  $[-.11, .51]$ ;  $t(576,988) = -3.14$ ,  $p = .02$ ;  $d = .37$ ), where post-treatment levels of affective dysregulation were lower ( $M = 2.04$ ,  $SD = .89$ ) than those at pre-treatment ( $M = 2.35$ ,  $SD = .97$ ). Similarly, fathers attending alone reported that the level of aggression initiated by them toward their child was lower at post-treatment ( $M = 1.18$ ,  $SD = .27$ ) compared to the reported levels of aggression reported at pre-treatment ( $M = 1.31$ ,  $SD = .36$ ). This reports achieved a significant mean difference ( $-.13$ , 95% CI  $[-.06, .20]$ ;  $t(70,057) = 3.81$ ,  $p < .001$ ) with a small to medium effect size ( $d = .47$ ).

Three parental outcomes did not yield significant pre-post differences. This included parental mood ( $t(86) = 1.18$ ,  $p = .96$ ), parental level of affective suppression ( $t(749,767) = .737$ ,  $p = .96$ ), and parental level of adaptive affective reflection ( $t(106,808) = 1.79$ ,  $p = .49$ ).

### **3.2.3. Biological Mothers Attending Connect Along With their Child's Biological Father**

#### ***Youth Outcomes.***

Biological mothers that attended Connect along with the biological father of their child reported higher levels of affective dysregulation in their children at post-treatment

( $M = 3.24$ ,  $SD = 1.07$ ) compared to pre-treatment ( $M = 3.72$ ,  $SD = 1.07$ ). These reports yielded a significant mean pre-post difference (.47, 95% CI [.27, .68];  $t(238,999) = 5.42$ ,  $p < .001$ ) with a medium effect size ( $d = .52$ ). Biological mothers attending with the biological father of their child also reported higher adaptive affective reflection by their children at post-treatment ( $M = 2.73$ ,  $SD = 1.03$ ) than at pre-treatment ( $M = 2.29$ ,  $SD = .86$ ). The mean difference between pre- and post-treatment levels of this variable was significant (-.44, 95% CI [-.21, -.68];  $t(32,609) = 3.71$ ,  $p < .001$ ;  $d = .44$ ). Post-treatment levels of child-parent anxious attachment were also reported to be lower at post-treatment ( $M = 3.03$ ,  $SD = .98$ ) than at pre-treatment ( $M = 3.21$ ,  $SD = 1.02$ ) resulting in a significant pre-post mean difference (.18, 95% CI [.05, .31];  $t(24,696) = 2.72$ ,  $p = .04$ ;  $d = .33$ ). Similarly, levels of child-parent avoidance attachment were lower at post-treatment ( $M = 2.97$ ,  $SD = 1.12$ ) than at pre-treatment ( $M = 3.23$ ,  $SD = 1.20$ ). The mean difference between pre- and post levels of avoidant attachment reach significance (.26, 95% CI [.09, .42];  $t(75,743) = 2.97$ ,  $p = .02$ ;  $d = .34$ ). Finally, biological mothers attending Connect along with the biological fathers of their child reported that the level of aggression initiated by their child and directed at them was lower at post-treatment ( $M = 1.57$ ,  $SD = .59$ ) than at pre-treatment ( $M = 1.85$ ,  $SD = .72$ ). The mean pre-post difference on this variable was significant (.28, 95% CI [.15, .41];  $t(103,600) = 4.18$ ,  $p < .001$ ) with a medium effect size ( $d = .50$ ).

Contrary the above findings, biological mothers attending with the biological father of their child did not report significant pre-post differences on the following youth outcomes: externalizing problems ( $t(52) = 1.69$ ,  $p = .34$ ), internalizing problems ( $t(63) = 1.48$ ,  $p = .34$ ), and youth's level of affective suppression ( $t(16,538) = 1.72$ ,  $p = .34$ )<sup>1</sup>.

<sup>1</sup> There was an incongruence between the results obtained from completers only analyzes and those obtained from ITT analyses. ITT analyses revealed that the mean pre-post difference for maternal reports of youth's affective suppression was significant (.23, 95% CI [.11, .34];  $t(62,593) = 3.93$ ,  $p < .001$ ) with post-treatment levels being significantly lower ( $M = 2.58$ ,  $SD = .88$ ) than pre-treatment levels ( $M = 2.82$ ,  $SD = .97$ ).

### **Parental Outcomes.**

Biological mothers attending the program along with the biological father of their child reported higher levels of parental satisfaction after completing the program ( $M = 3.84$ ,  $SD = .75$ ) than prior to beginning the program ( $M = 3.52$ ,  $SD = .72$ ). The pre-post mean difference was significant ( $-.33$ , 95% CI  $[-.17, -.48]$ ;  $t(451,658) = 4.31$ ,  $p < .001$ ) with a small to medium effect size ( $d = .48$ ). Similarly, these mothers also reported higher levels of parental efficacy at the end of the treatment ( $M = 3.66$ ,  $SD = .71$ ) compared to prior beginning the program ( $M = 3.23$ ,  $SD = .82$ ). This pre-post mean difference was also significant ( $-.43$ , 95% CI  $[-.25, -.61]$ ;  $t(152,281) = 6.67$ ,  $p < .001$ ) with a medium effect size ( $d = .53$ ). A significant pre-post mean difference was also found for parental levels of affective dysregulation ( $.33$ , 95% CI  $[.177, .49]$ ;  $t(693,094) = 4.31$ ,  $p < .001$ ;  $d = .48$ ) where mean post-treatment levels of affective regulation were reported to be lower ( $M = 2.34$ ,  $SD = .87$ ) compared to pre-treatment levels of the same variable ( $M = 2.68$ ,  $SD = .98$ ). Finally, mothers' levels of parental aggression toward their child were also lower at post-treatment ( $M = 1.19$ ,  $SD = .25$ ) than at pre-treatment ( $M = 1.40$ ,  $SD = .41$ ). This pre-post mean difference was also significant ( $.22$ , 95% CI  $[.13, .29]$ ;  $t(294,256) = 5.14$ ,  $p < .001$ ) with a medium effect size ( $d = .59$ ).

Significant differences did not emerge on a number of parental outcomes: parental mood ( $t(60) = .49$ ,  $p = .62$ ); parental levels of affective suppression ( $t(646,603) = 2.08$ ,  $p = .22$ ), and parental levels of adaptive affective reflection ( $t(395,882) = 1.88$ ,  $p = .30$ )<sup>2</sup>.

<sup>2</sup> There was an incongruence between the results obtained from completers only analyses and those obtained from ITT analyses. ITT analyses revealed that the mean pre-post difference for maternal self-report of adaptive affective suppression was significant ( $-.28$ , 95% CI  $[-.12, -.21]$ ;  $t(187,043) = -2.80$ ,  $p = .02$ ) with post-treatment levels being significantly higher ( $M = 3.32$ ,  $SD = .74$ ) than pre-treatment levels ( $M = 3.04$ ,  $SD = .86$ ).

### 3.2.4. Biological Father Attending Connect along with Their Child's Biological Mother

#### *Youth Outcomes.*

Paired-samples t-tests carried out on reports of youth's outcome provide by biological fathers attending Connect along with the biological mother of their child revealed a number of significant mean pre-post differences. Paternal reports of youth's level of affective dysregulation were lower at post-treatment ( $M = 3.21$ ,  $SD = .96$ ) than at pre-treatment ( $M = 3.69$ ,  $SD = .96$ ). The mean difference between pre-post was significant (.49, 95% CI [.27, .68];  $t(158,365) = 4.62$ ,  $p < .001$ ) with a medium effect size ( $d = .53$ ). Similarly, reported levels of affective suppression were lower at post-treatment ( $M = 2.56$ ,  $SD = .81$ ) than at pre-treatment ( $M = 2.94$ ,  $SD = .84$ ) constituting a significant pre-post mean difference (.38, 95% CI [.20, .53];  $t(90,617) = 3.59$ ,  $p < .001$ ) with a small effect size ( $d = .41$ ). In terms of attachment, post-treatment levels were lower for levels of child-parent avoidant attachment ( $M = 3.53$ ,  $SD = 1.16$ ) compared to pre-treatment levels of this same outcome ( $M = 3.89$ ,  $SD = 1.18$ ). The mean difference between pre-post levels of child-parent avoidant attachment was significant (.36, 95% CI [.19, .53];  $t(627,260) = 4.23$ ,  $p < .001$ ) with a small to medium effect size ( $d = .48$ ). Finally, the level of aggression initiated by youth as reported by these fathers was lower at post-treatment ( $M = 1.59$ ,  $SD = .59$ ) than at pre-treatment ( $M = 1.77$ ,  $SD = .72$ ). The mean difference between these two levels of aggression was significant (.18, 95% CI [.08, .28];  $t(159,193) = 3.47$ ,  $p = .01$ ) with a small effect size ( $d = .41$ ). No significant pre-post differences were apparent for paternal reports of youth's externalizing problems ( $t(54) = 1.66$ ,  $p = .68$ ), parental reports of youth's internalizing problems ( $t(59) = 1.44$ ,  $p = .67$ ), parental reports of youth's adaptive affective reflection ( $t(7,829) = 1.66$ ,  $p = .097$ ), and parental reports of the child-parent level of anxious attachment ( $t(175,488) = .78$ ,  $p = .86$ ).



### **Parental Outcomes.**

Fathers attending Connect along with the biological mother of their child reported significantly higher levels of parental satisfaction at post-treatment ( $M = 3.84$ ,  $SD = .75$ ) than at pre-treatment ( $M = 3.67$ ,  $SD = .76$ ). The mean pre-post difference was significant ( $-.16$ , 95% CI  $[-.02, -.29]$ ;  $t(923,622) = 2.26$ ,  $p = .02$ ) with an small effect size ( $d = .28$ ). A similar result was found for paternal reports of parental efficacy where levels of this variable were higher at post-treatment ( $M = 3.67$ ,  $SD = .72$ ) than at pre-treatment ( $M = 3.47$ ,  $SD = .75$ ). The mean difference between pre-post levels of parental efficacy was significant ( $-.20$ , 95% CI  $[-.07, -.32]$ ,  $t(672,675) = 3.06$ ,  $p = .002$ ) with a small effect size ( $d = .35$ ). A significant pre-post mean difference was also found for parental levels of affective dysregulation ( $.29$ , 95% CI  $[.08, .46]$ ;  $t(177,167)$ ,  $p = .01$ ;  $d = .20$ ) where the post-treatment levels of this variable ( $M = 2.37$ ,  $SD = .88$ ) were significantly lower than those reported at pre-treatment ( $M = 2.56$ ,  $SD = 1.04$ ). Similar results were also found for parental levels of adaptive emotional reflection ( $-.28$ , 95% CI  $[.10, -.45]$ ;  $t(814,852) = 3.15$ ,  $p < .001$ ;  $d = .36$ ) where post-treatment levels were significantly different ( $M = 3.32$ ,  $SD = .74$ ) than the pre-treatment levels of this outcome ( $M = 3.04$ ,  $SD = .86$ ). Lastly, post-treatment levels of aggression initiated by the reporting father toward their child were also lower at post-treatment ( $M = 1.24$ ,  $SD = .36$ ) than at pre-treatment ( $M = 1.42$ ,  $SD = .43$ ) constituting a significant pre-post mean difference ( $.18$ , 95% CI  $[.10, .25]$ ;  $t(371,986) = 4.42$ ,  $p > .001$ ) with a medium effect size ( $d = .61$ ). In contrast to these findings, no significant pre-post mean differences were evident for paternal self-reports of levels of mood ( $t(68) = .79$ ,  $p = .86$ ) or paternal self-reports of affective suppression ( $t(745,555) = 1.18$ ,  $p = .72$ ).

### **3.3. Is Connect Differentially Effective Across All Groups of Biological Parents?**

Prior to conducting the planned ANCOVA to test for the differential effectiveness of Connect on the groups of biological parents investigated, several assumptions were

tested in order to corroborate the appropriateness of the tests for the research question under study. First, ANCOVA requires the presence of linear relationships between the covariate (i.e., pre-treatment scores) and the dependent variable (DV; i.e., post-treatment scores) for all of the groups in the independent variable (IV; i.e., groups of biological parents). This assumption was tested through the use of scatterplots where the relationship between pre-treatment and post-treatment scores for each outcome was graphed for each group of parents. Visual investigation of these scatterplots did not reveal any indications of violation of the assumptions. Second, the assumption of homogeneity of slopes was statistically assessed through the calculation of the interaction term between the covariate used in the ANCOVA tests to follow and all levels of the IV. Homogeneity of regression slopes, as indicated by the calculated interaction term, was not statistically significant for any of the outcomes under investigation (i.e., significance level of the interaction term was higher than .05 for each outcome). Third, the assumption of normality of distributions was assessed by the Shapiro-Wilk's test of normality of the distributions of the standardized residuals for all levels of the IV and the overall model to be tested. Results from the Shapiro-Wilk's tests on the residuals yielded significance levels above .05, therefore suggesting that the distribution of the residuals were normal for all group of parents and for the overall model. Homoscedasticity, or equality of the variance of the residuals for all predicted values of the dependent variable, was assessed via scatterplots of the standardized residuals against the predicted values of each DV. Visual inspection of these scatterplots revealed that the residuals appeared to be randomly distributed and had approximately the same variance for all values of the predicted scores. The final assumption tested was the assumption of homogeneity of variance. There was homogeneity of variances as assessed by the Leven's test of homogeneity of variance ( $p > .05$ ) for all levels of the IV. Given that all assumptions were met the ANCOVA tests were performed as planned.

The results of all of the performed ANCOVA tests failed to reveal any significant group differences at post-treatment for each of the parental and youth outcomes after controlling for pre-treatment scores on each of the outcomes. In other words, no evidence was found that indicated that Connect was differentially effective at post-treatment for all of the outcomes investigated (see table 3.4). The lack of significance

across ANCOVA tests rendered any pairwise comparisons between groups unnecessary. Because of this, post-hoc tests were not carried out.

**Table 3.4 Results from ANCOVA tests.**

<b>Outcomes</b>	<b>df</b>	<b>F</b>	<b>p</b>
<b>Youth Outcomes</b>			
BCFPI			
Externalizing Behaviours	3, 774	.48	.72
Internalizing Problems	3, 774	.44	.73
ARC			
Affect Dysregulation	3, 774	.43	.73
Affect Suppression	3, 774	.22	.09
Affect Reflection	3, 774	.90	.45
CAPAI			
Attachment Anxiety	3, 774	.26	.06
Attachment Avoidance	3, 774	.18	.91
Conflict Tactics Scale			
Youth Aggression Toward Parents	3, 774	.34	.80
<b>Parental Outcomes</b>			
BCFPI			
Parental Mood	3, 774	2.07	.21
PSOC			
Parental Satisfaction	3, 774	.94	.42
Parental Efficacy	3, 774	1.88	.13
ARC			
Affect Dysregulation	3, 774	1.35	.26
Affect Suppression	3, 774	1.62	.18
Affect Reflection	3, 774	1.79	.15
Conflict Tactics Scale			
Parental Aggression Toward Youth	3, 774	.54	.66

## **Chapter 4.**

### **Discussion**

This study is the first one to concretely test the differential effectiveness of a parenting intervention for participating biological mothers and fathers and their children. Although Connect, the attachment-based parenting intervention investigated in this study, has been previously demonstrated to be an effective parenting intervention for the reduction of aggression, internalizing problems, and for the enhancement of family functioning (Moretti & Obsuth, 2009), there is no available empirical knowledge that indicates if parental characteristics (i.e., gender, parental co-participation in the program) guide differential effectiveness in this or any other parenting interventions.

Overall, the current study provides further evidence on the effectiveness of Connect. This evidence, in particular, suggests that biological parents that participate in Connect benefit from the intervention. Effectiveness was judged through significant pre- to post-treatment mean differences in levels of fifteen parental and youth outcomes. Three of these significant differences or benefits from the intervention were found across all biological parents attending Connect irrespective of their gender or whether they attended alone or with the other biological parents of their child. These consistent benefits stemming from Connect included (1) significant reductions in youths affect dysregulation, (2) reductions of parent-child and child-parent aggression and (3) enhancements of parental satisfaction and efficacy. For all of these, except for reductions of aggression, small to medium effect sizes support the effectiveness of the intervention. Reductions of parent-child and child-parent aggression saw the largest effect sizes in the study falling in the medium range. It is important to highlight that these significant benefits did not differ significantly between groups of parents therefore suggesting that, for these three outcomes, participation in Connect is equally beneficial

independent of whether the participating parents are the biological mother or father of the child or if they attended together or not. These findings around the consistent effectiveness of Connect across participating biological parents are encouraging given that they replicate previous findings that have found benefits in these three same domains after parental and caregiver (i.e., non-biological parent) participation in Connect (Moretti & Obsuth, 2009; Moretti et al., 2012).

It is important to highlight that the results of this study also parallel previous findings on the effectiveness of Connect that suggest that the benefits of Connect are not limited to children's emotional and behavioural functioning. Instead, parents also reported experiencing benefits in their own functioning, particularly associated with reductions in aggressive behaviours toward their child as well as higher satisfaction on how they parent their child and a higher sense of efficacy as a parent. These parental reports on the benefits they experienced after Connect are meaningful given that Connect's goal is to influence children's social, behavioural, and emotional adjustment through *dyadic change* initiated by parents. Although the mechanism that lead to youth's change after parental participation in Connect are still being studied (Moretti, Obsuth, Craig, & Bartolo, 2014), recognizing how participating in Connect benefits participating parents is an appropriate first step in unearthing how parental change is associated with improvements in children's adjustment.

Beyond the three consistent benefits experienced by biological fathers and mothers attending Connect, a number of differences between the groups of biological parents studied were evident. First, independent of whether they attended the program alone or with the biological father of their child, mothers reported benefits from participating in Connect on more parental and youth domains/outcomes compared to the biological fathers in the sample. In addition of experiencing benefits on family functioning, levels of affect dysregulation, and reductions in parent-child aggression, biological mothers reported significant enhancements in youth's affective reflection and levels of parent-child anxious attachment. The presence of these significant findings on maternal reports and not on paternal reports suggest that there are gender differences associated with the enhancement of affective reflection in youth and reduction of anxious attachment. An explanation of this gender difference can only be tentative at this point

given the paucity of research investigating the importance of parental gender on treatment effects. Nonetheless, it is possible that these findings could be explained by the gendered parenting roles still held in our societies. Although maternal and paternal parenting styles appear to be coming closer and closer to each other with paternal involvement in parenting increasing in recent years (Fagan, Day, Lamb, & Cabrera, 2014), important differences have been empirically pointed out between both parenting styles. Time-diary studies conducted in the U.S. and in Europe have suggested that mothers and fathers spend their time differently with their children (Bianchi, Wight, & Raley, 2005; Gauthier, Smeeding, & Furstenberg, 2004). Although mothers' time spent in engagement activities (e.g., playing with children, reading to them, and helping them with homework) has almost tripled in the last three decades, they still spend significantly more time in routine child-care tasks such as feeding and clothing. Mothers', therefore, spend more time with their children whether it is caring for them or interacting with them. This higher involvement in childrearing could permit mothers access to a larger window of opportunity in which they can enhance their relationships with their children, affect their emotional development, and foster behavioural regulation. Although time spent parenting children was not assessed or included in this study, partial support for this explanation could be found in the composition of one-parent families included in the sample. One-parent families were disproportionately represented in the sample, especially in the group of participating biological mothers attending Connect alone. This finding in itself suggests that this group of mothers are most likely involved in most of the parenting duties at home with, perhaps, some limited assistance from other caregivers. Given that these mothers play the most relevant parenting role in their children's lives, it is not surprising that mothers attending Connect benefit differentially and significantly more from participating in the program than biological fathers attending Connect either alone or not.

Beyond the already discussed effectiveness of Connect across groups of participating biological parents and the intriguing gender differences discussed above, two additional findings need to be mentioned here. First, it was expected that Connect would be effective in reducing both externalizing and internalizing problems in youth as reported by their parents. This, in fact, has been a consistent findings form previous empirical investigations of Connect (Moretti, Holland, Moore, & McKay, 2004; Moretti &

Obsuth, 2009; Obsuth, Moretti, Holland, Braber, & Cross, 2006; Stattin et al., 2015). Contrary to these previous findings, evidence for a significant reduction in externalizing and internalizing problem in youth was only evident in reports provided by biological mothers attending Connect alone. The reduction in externalizing behaviours is important given that, despite finding that all groups of participating biological parents reported seeing a significant reduction in youth initiated aggression toward parents, only biological mothers attending alone saw a more generalized reduction in all types of externalizing behaviours. Furthermore, the significance of this finding is reinforced by the fact that biological mother attending Connect alone did not differ statistically from other groups of participating biological parents in terms of the pre-treatment level of externalizing or internalizing. This means that this decrease in externalizing behaviours was not only significant but also substantial. The medium effect size found for this shift in children's externalizing behaviours supports this claim.

The second finding worth discussion revolves around the null findings of the study. Analyses revealed that there were no significant reported benefits in two parental outcomes for any of the groups of biological parents under study. These were parental mood and parental level of affective suppression. These null findings are noteworthy given that both parental emotional suppression and low mood have been associated with youth negative affectivity in early life and in adolescence and, more relevant for the present study, positive shifts in these parental domains has been linked to more adaptive emotional functioning in children (Byrne et al., 2006; Garber, Ciesla, McCauley, Diamond, & Schloedt, 2011; Remmes & Ehrenreich-May, 2014).

#### **4.1. Fathers in Connect**

One of the main goals of this study was to highlight the effectiveness of Connect for biological fathers attending the program. This goal developed from the void that exists in the literature around paternal participation in parenting intervention. In fact, in recent reviews of the literature on the effectiveness of parenting interventions, paternal data is either missing or impossible to be disaggregated from maternal data (Panter-Brick et al., 2014; Phares, Lopez, Fields, Kamboukos, & Duhig, 2005). Yet, despite

efforts to include biological fathers in the analyses for the present study a notable difference in program participation was readily apparent. Fathers only accounted for 19% of the total sample used in the reported analyses. This low participating rate by fathers has two significant implications for the present study. First, the low participating rate of fathers suggests that barriers still exist preventing fathers' participation in parenting interventions. Some of these barriers have been previously identified and include lower family income and ethnicity (Wong, Roubinov, Gonzales, Dumka, & Millsap, 2013). Although an investigation of the barriers of paternal participation in Connect is beyond the scope of this study, it is evident that efforts need to be put forward to attract fathers into parenting interventions such as Connect. Second, it is likely that the low number of participating fathers negatively impacted the power of the analyses on biological fathers. This, limitation, therefore brings into question the validity of the findings reported above. Yet, despite the possibility of compromised power in these analyses, encouraging results were obtained for participating fathers. Namely, fathers consistently reported enhancements in youth's and their own affect regulation, also reported reductions in avoidant parent-child attachment, and reductions in youth's and their own aggressive behaviours. In addition, the fact that no significant group differences were found supporting differential effectiveness of Connect for biological parents suggests that biological fathers benefits as much as biological mothers from participating in the program at least on the outcomes just mentioned. These positive results suggest that paternal participation in parenting interventions such as Connect is warranted and should be further studied.

## **4.2. Parental Co-participation in Connect**

An additional goal of this study was to examine if parental co-participation, or attending the parenting intervention along with the other biological parent of the child, provided any additional benefits to completing participation in Connect. As mentioned in the introduction of this study, little to no evidence is available investigating the effect of co-participation on parenting interventions. Results from this study did not find any evidence suggesting any additional benefits stemming from co-parenting in Connect. This finding is very relevant given the recent calls for increased attention to co-parenting



in parenting research and for the re-evaluation of recruitment procedures in parenting interventions in order to attract more couples to these interventions (Panter-Brick et al., 2014; Ramchandani & Iles, 2014). Although traditionally co-parenting was thought to introduce important gendered dynamics into the family structure, the evidence presented in this study suggest that, at least for Connect, the benefits yielded by biological mothers and fathers attending with the other biological parent of their child did not differ from the benefits of those biological parents attending alone. In fact, as presented above, it was biological mothers attending Connect alone who appeared to benefit more consistently across all youth and parental outcomes assessed in this study. As such, this study provides some evidence that disputes the growing appeals for increased participation of co-participation of biological parents in parenting interventions.

### **4.3. Limitations**

The novelty of the findings presented above needs to be qualified by the limitations of the study. Four main limitations can be identified. First, despite efforts to deal with missing data, the presence of missing data and the methods selected to impute missing data carry with them the possibility of biasing the findings. This limitation is particularly relevant for those outcomes that presented with large amounts of missing data both at pre- and post-treatment. As evident in table 2.1, these outcomes include youth's externalizing behaviours, youth's internalizing problems, and parental mood levels. As such, the results and conclusions made about these outcomes need to be used with caution particularly because the findings herein presented contradict, at least in part, previous findings that suggest that Connect is generally effective in reducing youth's externalizing and internalizing problems (Moretti & Obsuth, 2009; Moretti et al., 2012). The null findings associated with benefits on these outcomes for biological mothers attending alone and biological mothers and fathers attending together with the other biological parent of their child, therefore, need to be considered as preliminary.

Second, given that Connect is a group-based parenting intervention, the issue of group dependencies becomes relevant for the present study. For any group intervention, it is possible that participants vary systematically from each other based on their

identification with the group they participated in. In other words, members of the same group will vary from those of other groups because of individualities that took place within their group (e.g., leader characteristics, group composition, etc.). An additional type of dependency that occurred in the data presented here is that which related to the dependency between parents attending Connect together. These dependencies in the data are problematic because they can potentially increase the likelihood that Type I errors are made. Although a statistical check of the presence of inter-group dependencies was carried out as part of the assumption checking procedures for the ANOVA tests performed in the study, it is important to highlight that there is still a chance for dependencies to occur in the data.

Third, and related to the issue with dependencies in the data, is the problem of multiple comparisons. The study described above is exploratory in nature. This characteristic of the study, therefore, carries with it the need to systematically and carefully investigate the posed research questions for all and each of the outcomes under study. For this study, I examined a total of fifteen outcomes in four groups of participating biological parents. This permutation of groups and outcomes yielded a large number of analyses and group comparisons that needed to be made to arrive at the findings presented above. This approach to exploratory studies carries with it the risk of increasing Type I error. To control for this risk, methods of adjusting significance levels of the findings were used. Namely, the well-known and very conservative Bonferroni method of significance adjustment for multiple comparisons was used in all analyses (Dunn, 1961). Nonetheless, the risk of committing a type I error in the findings above needs to be kept in mind.

Finally, although significant pre- to post-treatment differences were obtained in most outcomes analyzed in these study, this assessments need to be carefully understood as proxies for treatment change. Pre- to post-treatment analyzes are often considered to be limited assessments of true change given (1) possible pre-treatment difference between groups, (2) likely unreliability of raw scores, and (3) for simply being possible indexes of regression to the mean. Although these limitations do not invalidate the findings presented in this study, they do require replications of these findings. Ideally, these replications control for pre-treatment differences in the groups being compared,

assess outcomes longitudinally, and goes beyond post-treatment levels of the outcomes of interest by also assessing these outcomes long past the end of the intervention. Currently, efforts to collect data that conforms to these requirements are underway at the Adolescent Health Laboratory at Simon Fraser University.

#### **4.4. Future Research**

This study and its findings were inspired by voids in the literature. Consequently, knowledge resulting from research that focuses on the effectiveness of parenting interventions for attending fathers is “there for the taking”. It is indisputable that fathers play an important role in children’s parenting, yet, we know little about how it is that father’s participation in parenting interventions lead to changes in their children’s adjustment. In addition, and much more related to the research presented in this study, we know nothing about why biological mothers and fathers benefit from participating in parenting interventions such as Connect for some outcomes but not others, and more importantly, why is it that mothers and fathers report differential benefits on their children after participating in Connect. The mechanisms behind this gendered effectiveness needs to be identified.

Furthermore, future research needs to focus on the relevance of program co-participation for the effectiveness of parenting interventions. The findings presented here suggest that there is not an effect of co-parenting for the effectiveness of Connect, nonetheless we need confirmation of this finding. This future research on co-participation needs to assess not only the attendance of co-parenting couples in parenting interventions, but should also assess the quality and variable nature of co-parenting. By this I mean, for instance, that the time each of the parents spends with the child needs to be assessed as well as parenting roles of each parent. These nuances of what constituted co-parenting are central to unearthing if, how, and why co-participation (and co-parenting) is relevant for parenting interventions.

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